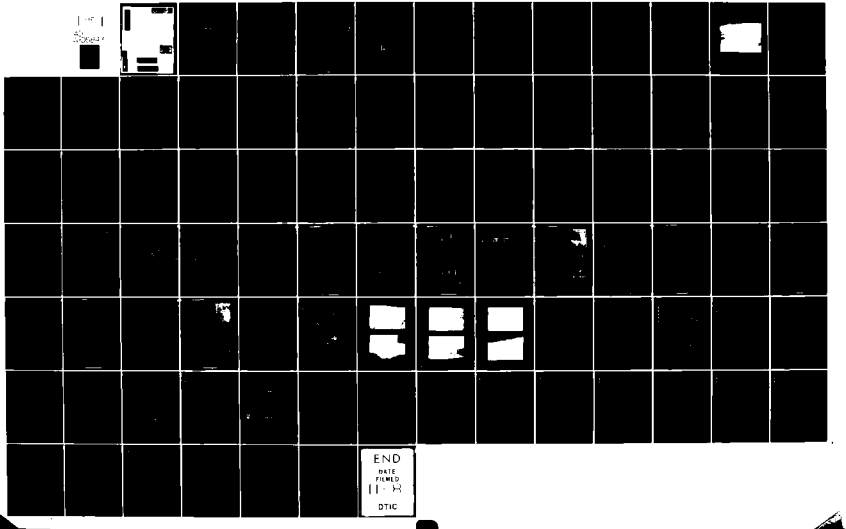
AD-A105 843 ERDMAN ANTHONY ASSOCIATES ROCHESTER NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. ISCHUA CREEK WATERSHED DAM NUMBER --ETC(U)
AUG 81 R J FARRELL DACW51-81-C-0017
UNCLASSIFIED NL



LEVEL II

DISCLAIMER NOTICE

THIS DOCUMENT IS BEST QUALITY PRACTICABLE. THE COPY FURNISHED *TO DTIC* CONTAINED A SIGNIFICANT NUMBER OF PAGES WHICH DO NOT REPRODUCE LEGIBLY.

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER	2. GOVT ACCESSION NO. AD-A105 843 / 3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Phase I Inspection Report Ischus Creek Watershed Dam #2, Cattaraugus County, NY Inventory No. 560	5. TYPE OF REPORT & PERIOD COVERED Phase I Inspection Report National Dam Safety Program 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) (10) ROBERT J. FARRELL	8. CONTRACT OR GRANT NUMBER(s) (15) DACW51-81-C-0017
9. PERFORMING ORGANIZATION NAME AND ADDRESS Erdman, Anthony, Associates 242 Andrews Street P.O. Box 9589 Rochester, New York 14604	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS (12) 87
11. CONTROLLING OFFICE NAME AND ADDRESS Department of the Army 26 Federal Plaza New York District, CofE New York, New York 10287 (11)	12. REPORT DATE 18 August 1981 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) Department of the Army 26 Federal Plaza New York District, CofE New York, NY 10287	15. SECURITY CLASS. (of this report) UNCLASSIFIED 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report) (6)

National Dam Safety Program. Ischua Creek Watershed Dam Number 2 (Inventory Number N.Y. 560), Allegheny River Basin, Cattaraugus County, New York. Phase I Inspection Report.

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Ischua Creek Watershed Dam #2
Cattaraugus County
Allegheny River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and visual inspection of Ischua Creek Watershed Dam No. 2 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

423602 slr

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

Drainage gullies were observed across the emergency spillway and emanating from the downstream east toe of the embankment. In addition, a bulge or slough was observed in the upper portion of the downstream east slope. It is recommended that these conditions be evaluated further by a qualified registered professional engineer.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtoppped under full PMF conditions. The PMF routed through the reservoir required 97 percent of the spillway outflow capacity. The spillway is, therefore, judged to be adequate.

The investigations recommended should be completed within 12 months of notification to owner, and remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within 1 year of notification to owner:

- construct a gate well for the drain gate, extend the gate stem to the top of the riser structure and install rungs on the riser structure to provide access.

- debris and vegetation should be cleared from the trash racks, downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

- provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the gate systems. Document this information for future reference.

- develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

ALLEGHENY RIVER BASIN

ISCHUA CREEK WATERSHED
DAM No. 2

CATTARAUGUS COUNTY, NEW YORK
INVENTORY No. N.Y. 560

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT, CORPS OF ENGINEERS

AUGUST 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the Investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event a finding that a spillway will not pass the Test Flood should not be interpreted as necessarily posing a highly inadequate condition. The Test Flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

TABLE OF CONTENTS

TABLE OF CONTENTS - con't.

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Ischua Creek Watershed Dam No. 2
State Located:	New York
County Located:	Cattaraugus
Stream:	Johnson Creek
Basin:	Allegheny River
Date of Inspection:	April 2, 1981

ASSESSMENT

Examination of available documents and visual inspection of Ischua Creek Watershed Dam No. 2 and appurtenant structures did not reveal conditions which constitute a hazard to human life or property. However, the dam has some deficiencies which require further investigation and remedial action.

Drainage gullies were observed across the emergency spillway and emanating from the downstream east toe of the embankment. In addition, a bulge or slough was observed in the upper portion of the downstream east slope. It is recommended that these conditions be evaluated further by a qualified registered professional engineer.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtoppped under full PMF conditions. The PMF routed through the reservoir required 97 percent of the spillway outflow capacity. The spillway is, therefore, judged to be adequate.

The investigations recommended should be completed within 12 months of notification to owner, and remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within 1 year of notification to owner:

- construct a gate well for the drain gate, extend the gate stem to the top of the riser structure and install rungs on the riser structure to provide access.

- debris and vegetation should be cleared from the trash racks, downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

- provide a program of periodic inspection and maintenance of the dam and appurtenances including yearly operation and lubrication of the gate systems. Document this information for future reference.

- develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

Robert J. Farrell

Robert J. Farrell, P.E.
New York No. 56983

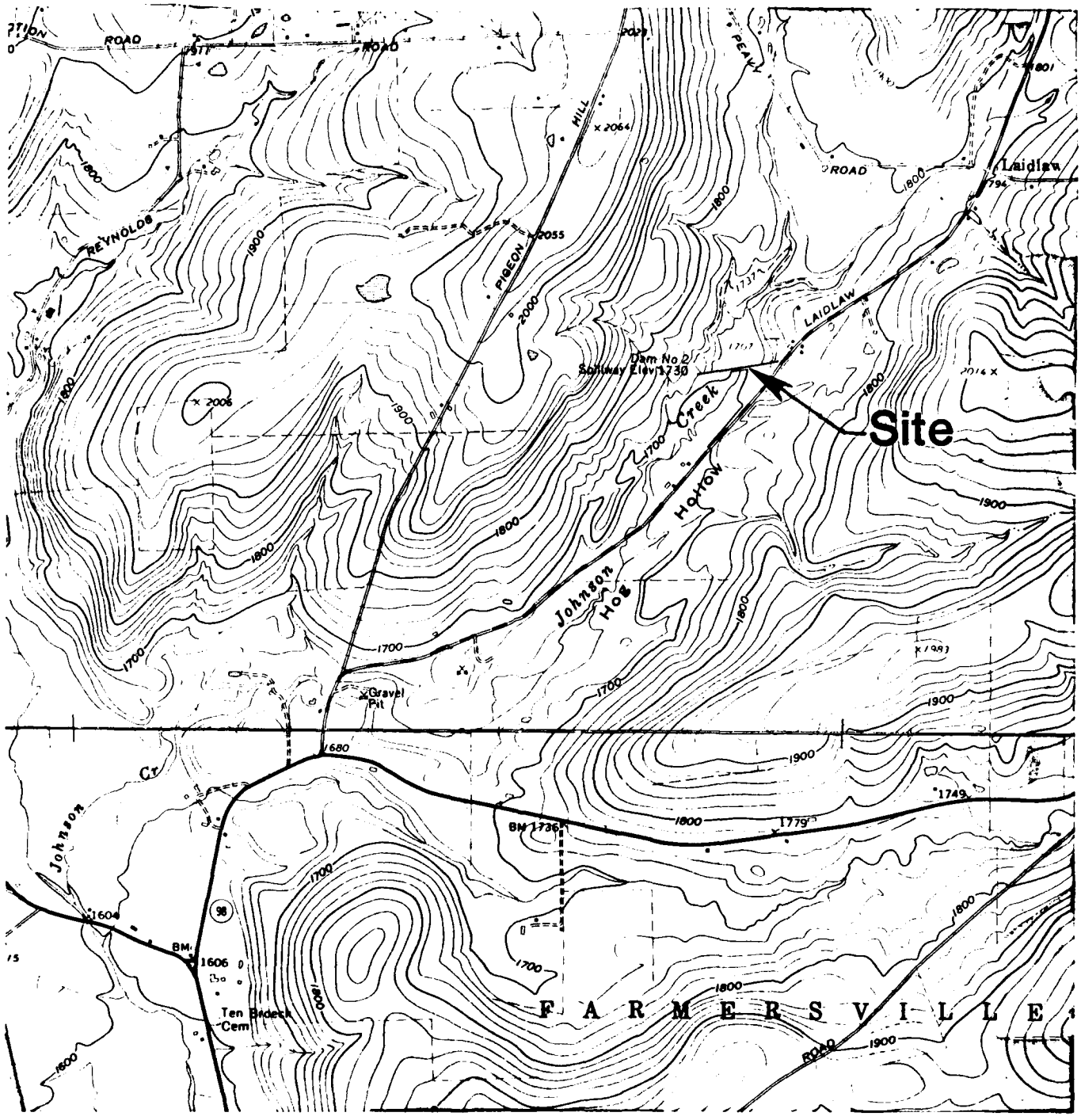
Approved by:

Col. W.M. Smith, Jr.
New York District Engineer

Date: 18 Aug 81

Ischua Creek Watershed
Dam No. 2

OVERVIEW



Ischua Creek Watershed
Dam No. 2

LOCATION PLAN

Scale: 1" = 2000'

PHASE I INSPECTION REPORT

NATIONAL DAM SAFETY PROGRAM

ISCHUA CREEK WATERSHED DAM NO. 2

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New York District Corps of Engineers in a letter dated 24 February 1981, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, dated 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Location

The Ischua Creek Watershed Dam No. 2 is located on Johnson Creek approximately 4 miles northeast of Franklinville, New York. It can be reached from Laidlaw Road which intersects State Rt 98 about 1.5 miles to the south. The dam is shown on U.S.G.S Delevan, New York quadrangle with coordinates approximately at N42° 23' 32", E 78° 25' 15" (see location plan). Page B-4 of Appendix B is a site plan for this dam.

b. Description of Dam and Appurtenances

The dam consists of a zoned earthfill embankment with an earthfill cutoff trench below; a principal spillway with a reinforced concrete riser structure and outlet pipe; and a vegetated earth channel emergency spillway located to the right of the dam embankment. The length of the dam embankment is approximately 1400 ft. The emergency spillway is 140 ft. wide at the control section.

1) Dam Embankment

The core of the embankment is constructed of semi-pervious silty sand and gravel. The core is surrounded by sand and gravel shells. The dam is approximately 1400 ft. long and a maximum of 42 ft. high. The toe of the downstream slope is constructed of rock fill.

The upstream slope is 3 horizontal to 1 vertical and the downstream slope is 2.5 horizontal to 1 vertical. The crest width is 14 ft. There are berms on the upstream slope approximately 8 ft. wide. The lower berm on the upstream slope extends the full length of the dam at elevation 1706.0 ft. (MSL). The upper berm on the upstream slope is at elevation 1721.0 ft. (MSL). It also extends the full length of the dam. The purpose of these berms is wave erosion protection.

Beneath the embankment is an earthfill cutoff trench which is 14 ft. wide at the bottom. According to available plans, it is constructed of the same material as the semi-pervious core.

The dam is founded on silty sand and gravel (designated GM using the Unified Soil Classification System).

2) Emergency Spillway

The emergency spillway is cut into silty sand and gravel in the west abutment. A diversion berm of compacted fill has been constructed on the east side of the channel. It has side slopes of 3 horizontal to 1 vertical. The grass covered channel curves around the west end of the dam embankment.

The control section is 140 ft. wide and 30 ft. long and the downstream channel is roughly 700 ft. long.

3) Principal Spillway

The principal spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled inlet pipe and a 36 in. outlet pipe supported on a concrete cradle.

The inside dimensions of the riser structure are 26 ft. high and 9 ft. wide normal to the axis of the dam. It is 3 ft. long parallel to the embankment and flares to 12 ft. long at the top. The walls of the structure are 12 in. thick. The structure is founded on a 7.3 ft. by 14.3 ft. spread footing.

The "low stage inlet" is an uncontrolled opening approximately 11 ft. above the sluice gate invert. It is 20 in. wide and 7 in. high and is located on the east side of the riser. The water flows over this orifice and drops into the riser structure. It is protected by a trash rack assembly approximately 3.7 ft. high and 2.5 ft. wide. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 25 ft. above the sluice gate invert. They are 9 ft. wide and 12 in. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by galvanized 3 steel tubes placed in the sloping section below each opening. A 30 in. diameter manhole permits access into the riser structure.

The riser structure is drained by a 36 in. diameter reinforced concrete pressure pipe. It is 222 ft. long and drops approximately 2 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 9 in. thick concrete cradle within the embankment. Plans indicate 6 reinforced concrete antiseep collars cast around the pipe within the embankment.

The downstream end of the conduit extends approximately 8 ft. downstream of the embankment. The pipe is supported by a reinforced concrete bent 8 ft. by 8 ft. square and 12 in. thick. The discharge conduit outlets into a stone lined plunge pool.

4) Reservoir Drain Inlet

At the base of the structure is an 8 in. diameter, vertical lift, sluice gate inlet which is controlled by a wheel and stem. An 8 in. bitumenous coated corregated metal pipe extends 40 ft. upstream from the lift gate into the impoundment pool. Plans indicate 26 in. diameter vertical metal pipe at the upstream end of the pipe with a perforated plate across the open end to prevent trash from entering.

5) Foundation and Embankment Drainage

A 4 ft. wide trench drain is located below the downstream slope approximately 80 ft. downstream of the centerline of the dam. This drain outlets into the rock fill toe of the downstream slope.

c) Size Classification

The dam's height of 42 ft. places it in the INTERMEDIATE size category according to the Corps of Engineers' Recommended Guidelines.

d) Hazard Potential Classification

The hazard potential classification for this dam is HIGH because of the significant economic losses and high potential for loss of life downstream in the event of dam failure. Section 5 of this report presents more detailed discussion of the hazard potential.

e) Ownership

The dam is owned and operated by:

Chattaraugus County
James M. Cash - Chairman of Oversight Committee
RD #2
Maple Grove Road
Franklinville, New York 14737
Tele: (716) 767-3604

f) Purpose of Dam

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 1792 acres. The temporary storage is released gradually through the two-stage principal spillway system.

g) Design and Construction History

The dam was built under the Watershed Protection and Flood Prevention Act by the Ischua Creek County Small Watershed Protection District with the assistance of the Soil Conservation Service. It was completed in 1961.

h) Normal Operating Procedures

The dam is normally self-regulating.

1.3 Pertinent Data

a. Drainage Area

The drainage area for this dam covers 2.8 square miles. It is made up primarily of rolling pasture and woodland and minor development.

b. Discharge at Dam Site

1) Outlet Works

Normal discharge at the site is through the 36 in. diameter outlet pipe. In the event of severe flooding, water would flow over the emergency spillway at elevation 1729.5 ft. (MSL). The invert of the low stage orifice is at elevation 1706.5 ft. (MSL). The invert of the high stage orifice is at elevation 1721.0 ft. (MSL)

2) Maximum Known Flood

There is no data available for the maximum known flood at dam site. Evidence of recent high water was observed at elevation 1720.0 ft. (MSL).

3) Ungated Spillway Capacity at Top of Dam

The capacity of the principal spillway with the reservoir at top of dam elevation 1735.2ft. (MSL) is 195 cfs. The capacity of the emergency spillway is 6396 cfs at this level.

4) Ungated Spillway Capacity at Test Flood

The capacity of the principal spillway with the reservoir at test flood elevation (1735.1 ft. MSL) is 195 cfs. The capacity of the emergency spillway is 6196 cfs at this level.

5) Gated Spillway Capacity at Normal Pool

There are no gated spillways.

6) Gated Spillway Capacity at Test Flood

As previously mentioned, there are no gated spillways.

7) Total Spillway Capacity at Test Flood

The total spillway capacity at test flood elevation (1735.1 ft. MSL) is 6391 cfs.

c) Elevation (ft. above NGVD)

1) Streambed at toe of dam: 1693.0
2) Bottom of cutoff: variable, approximately 1692 minimum
3) Maximum tailwater - unknown, outlet conduit invert 1694
4) Normal pool: 1706.5
5) Full flood control pool: 1729.5

6) Spillway crest - Pond Drain Inlet: 1697.0
Low Level Orifice: 1706.5
High Level Orifice: 1721.0
Emergency Spillways: 1729.5

7) Design surcharge (original design): 1732.7

8) Top of dam: 1735.2

9) Test flood surcharge: 1735.1

d) Reservoir (Length in feet)

1) Length of maximum pool: 2200 ±

2) Length of normal pool: 600±

3) Length of flood control pool: 2100±

e) Storage (acre-feet)

1) Normal pool: 25.0

2) Flood control pool: 440

3) Spillway crest pool

a) Low stage inlet: 25
b) High stage inlet: 215
c) Emergency spillway: 440

4) Test Flood: 643

5) Top of Dam: 647

f) Reservoir Surface (acres)

1) Normal pool: 7.0

2) Flood control pool: 32.5

3) Spillway crest pool

a) Low stage inlet: 7.0

b) High stage inlet: 22.0

c) Emergency spillway: 32.5

4) Test flood: 40.9

5) Top of dam: 41.0

g) Dam

1) Type: Earth Embankment

2) Length: 1400

3) Height: 42 ft.

4) Top Width: 14 ft.

5) Side Slopes:

Upstream: 3H: 1V
Downstream: 2.5H:1V

6) Zoning: Semi-pervious core of silty sand and gravel, sand and gravel shells, rock fill downstream toe, blanket type seepage drain under downstream embankment

7) Impervious Core: Semi-pervious silty sand and gravel

8) Cutoff: 14 ft. width, earthfill

9) Grout Curtain: None

h) Diversion and Regulating Tunnel

Not applicable

i) Spillways

1. Type:

a) Principal Spillway: Reinforced concrete drop inlet

b) Emergency Spillway: Grass covered earth channel cut in right abutment

2. Length of Weir:

a) Low Level Orifice: 20 in.

b) High Level Orifice: 18 ft.

c) Emergency Spillway: 140 ft.

3. Crest Elevation: (feet above NGVD)

a) Low Level Orifice: 1706.5

b) High Level Orifice: 1721.0

c) Emergency Spillway: 1729.5

4. Gates: 8 inch diameter vertical lift sluice gate on reservoir drain inlet

5. Upstream Channel: Johnson Creek, narrow stream to reservoir through farm and woodland

6. Downstream Channel: Johnson Creek, narrow stream through rolling farm and woodland

j. Regulating Outlet: None

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

Bedrock at the dam site is Upper Devonian Age (345-375 million years ago) interbedded shales and siltstones known as the Canadaway Group. These relatively flat lying and underformed rocks are thin to medium bedded and typically slightly weathered. Regionally the rocks form a homocline dipping sourthward to southwestward at approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially flat-lying over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist.

The Ischua Creek Watershed Dam No. 2 is in a region classified as Zone 2 seismicity, as shown on Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene glaciation (beginning approximately 2 million years ago) has modified topography by means of erosion and deposition. The thick continental ice sheet advanced southward from Quebec and Ontario smoothing terrain with glacial scour and mantling uplands with till deposits. The pleistocene geology of the dam site consists of glacial end moraine deposits. Generally coarse gravel deposits with abundant boulder material overlay a dense silty clay glacial till, deposited by melting of ice at the edge of the ice sheet during a still stand in the advancement of the continental glacier. Recent alluvial silts and sands deposited on the glacial material via upland erosion is also common.

2.2 SUBSURFACE INVESTIGATION

Test hole logs are contained in the "As-Built" drawings. A total of 5 test pits and 4 drill holes were dug to determine subsurface conditions. The logs show that the dam is founded on glacial till at the north abutment and on silty sand and gravel in the center and south abutments.

2.3 DESIGN RECORDS

The records available for the project consists of 9 contract drawings which show the plans, sections and details of the dam, appurtenant structures, impact basin details and grating, fencing details, and logs of test holes; and a design report issued by the U.S. Soil Conservation Service dated April 5, 1961.

2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

The sedimentation basin structure shown on Page 2 of the "As-Built" drawings was not found during the visual inspection.

2.5 OPERATION RECORDS

No written maintenance or operation records exist for the dam

2.6 EVALUATION OF DATA

Information obtained from the "As-Built" drawings is consistent with observations made during this inspection. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.

SECTION 3 - VISUAL INSPECTION

3.1 Findings

a) General

The Ischua Creek Watershed Dam No. 2 is in good condition at the present time.

b) Dam

1) Earth Embankment (See Photo 5)

The earth embankment is generally in good condition at the present time. Small (1 in. x 1 in.) eddy current type erosion gullies were noted over most of the embankment. Animal burrows were noted at approximately 10 ft. above the downstream toe at 100 ft. and 250 ft. to the left of the right abutment. Five animal burrows were noted to the right of the outlet pipe and erosion gullies up to 6 in. deep extended from these burrows to the outlet channel. It is possible that these burrows intercept the seepage drain causing a concentration of flow at this location. This should be investigated.

A small bulge in the slope was noted approximately 10 ft. below the crest and 100 ft. east of the outlet pipe in the downstream slope. Two animal burrows were noted at this location and the slough may be the result of animal activity.

The crest of the dam is in good condition with no evidence of vertical or horizontal movement.

There is no slope protection on the upstream slope other than the vegetative cover and a 10 ft. berm at the water line. Approximately 2 to 4 in. of erosion due to wave action was noted at the water line on the upstream slope.

The trench type toe drain under the downstream slope appears to be functioning properly as no seepage was noted at the dam. The wet area downstream of the left side is believed to be caused by natural groundwater and the recent spring thaw.

2) Emergency Spillway (See Photo 6)

The emergency spillway is generally in good condition at the present time. There is an area at the upstream end of the channel where heavy surface runoff emanating from the adjacent natural slope has cut erosion gullies across the channel. These gullies are up to 3 ft. deep and 4 ft. across. A drainage path should be provided to allow this area to drain without eroding the spillway channel.

Animal burrows were noted in the slope of the diversion dike located along the left side of the channel. These are approximately 150 ft. downstream of the control section.

c) Principal Spillway

1) Drop Inlet Structure (See Photos 1 and 2)

The structure is in good condition with no evidence of spalling, cracking, or efflorescence. The trash racks are in good condition. The stem of the reservoir drain gate is located on the north outside wall of the riser structure. The top of the stem was approximately 1.0 ft. above the water surface at the time of observation. The gate was inaccessible and could not be tested. The design drawings (Page B-10) indicate that a gate well was to have been constructed out of a half section of 48 in. bituminous coated corrogated metal pipe, and that the stem was to be extended all the way to the top of the riser.

d) Reservoir Area (See Photo 1)

The shore of the reservoir is generally shallow sloping pasture or woodland. It appears to be stable and in good condition.

e) Downstream Channel (See Photo 4)

The downstream channel is a narrow channel passing over rolling terrain. There is rip rap protection of the plunge pool, but erosion of the banks has taken place above the rip rap.

3.2 Evaluation

The dam is generally in good condition. The potential problems noted during the visual inspection are listed below.

a) Drainage gullies on the upstream end of the emergency spillway

b) Animal burrows in the emergency spillway diversion dike and the downstream slope

c) Erosion of the downstream channel banks above the level of the rip rap

d) Apparent sloughing of the downstream slope to the east of the outlet structure.

e) Drainage gullies emanating from the animal burrows near the downstream toe to the left of the outlet.

f) Inadequate length of stem on the drain gate, and lack of a gate well

g) The inaccessibility of the top of the drain gate stem

h) Potential inoperability of the drain gate

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

4.2 MAINTENANCE OF DAM

Maintenance of the dam is performed when the need arises. Maintenance is not considered adequate as evidenced by drainage gullies, animal burrows, channel erosion, etc.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 Drainage Area Characteristics

Ischua Creek Watershed Dam No. 2 is located on Johnson Creek, a tributary of Ischua Creek in the Allegheny River basin, and has a drainage area of 2.8 square miles. The dam is situated approximately 4.0 miles northeast of Franklinville, New York, and 4.0 miles southeast of Machias, New York. The topography of the watershed is gentle rolling hills.

5.2 Design Data

This dam was designed as a Class C structure in accordance with criteria established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to P(100) + 0.26 [PMP-P(100)], while the freeboard pool is designed for the PMP rainfall.

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to contain the runoff for the 100-year flood without discharging through the emergency spillway. The peak inflow and outflow are 1565 cfs and 146 cfs, respectively. The SCS design allowed for a 50-year sediment accumulation with a storage of 25 acre-ft. The principal spillway consists of a 36 in. diameter reinforced concrete water pipe and a 3.0 ft. x 9.0 ft. reinforced concrete riser with two 9.0 ft. x 12 in. openings with a crest elevation of 1721.0 ft. (MSL). The riser has a 20 in. x 7 in. orifice with invert elevation of 1706.5 ft (MSL). The emergency spillway control cross section is 140 ft. wide. with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1729.5 ft. (MSL). The dam crest elevation is 1735.2 ft (MSL).

5.3 Analysis Criteria

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 22.4 in. (24 hours 200 sq. miles) from Hydrometerological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 42 ft. high and impounds approximately 647 acre-ft. at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60, 80, and 100% of the PMF flows. The PMF inflow of 6457 cfs was routed through the reservoir and the peak outflow was determined to be 6391 cfs. The peak PMF outflow would produce an eroding velocity of 9.8 ft./sec. on the emergency spillway.

5.4 Reservoir Capacity

The reservoir capacities at the crest of the emergency spillway and at the top of the dam are 440 acre-ft. and 647 acre-ft., respectively. Surcharge storage between the emergency spillway crest and the top of dam is equivalent to 1.4 in. of runoff from the drainage area.

5.5 Experience Data

There are no flood records for the dam site. However, during the field investigation, evidence of recent high water was observed at elevation 1720.0 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 88 cfs.

5.6 Overtopping Potential

The maximum capacity of the spillway is 6591 cfs which is greater than the PMF peak outflow of 6391 cfs. The dam is not overtopped by the PMF, the peak elevation being 0.1 ft. below the top of the dam.

5.7 Analysis of Downstream Impacts

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on Page D-2, Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structure. This situation occurs at six structures (Locations 1 and 3) in addition to the road crossing being overtopped at Location 3.

5.8 Evaluation

The spillway of Ischua Creek Watershed Dam No. 2 will safely pass the PMF without overtopping. The spillway is, therefore, assessed as "Adequate". Potential problems include:

a) Erosion of the emergency spillway for the test flood conditions. Because of the low probability of occurrence of the PMF, and because there is no cost effective means of preventing the erosion, no preventative recommendations are deemed necessary.

b) The danger of loss of life and economic damage downstream of the dam for the test flood conditions.

TABLE 5.1

SUMMARY OF DOWNSTREAM IMPACTS FOR PMF

Location # (see page D-2, Appendix D)	Location	# of Dwellings	Structure Height above Streambed* (ft)	Peak Flow (cfs)	Peak Stage (ft)	Comments
1	1800' d/s of the dam	1	7.5	6382	8	Danger of loss of life
2	2100' d/s of Location #1	0	-	6367		
3	5500' d/s of Location #2	4 1	8 7	6354 6354	10 10	Danger of loss of life, road crossing over-topped

*The structure height above the streambed is the difference in the first floor elevation and the channel invert.

SECTION 6 - STRUCTURAL STABILITY

6.1 Visual Observations

There does not appear to be significant displacement or distress associated with the embankments at this site. A small bulge in the upper left portion of the downstream slope should be investigated and repaired.

6.2 Design and Construction Data

Analyses carried out during the design and construction phase included a slope stability analysis under full drawdown conditions by a modified Swedish circle method. The soil parameters assumed were:

Upstream slope: full drawdown, 8 ft. berms @ 1720 ft. and 1717 ft., $\phi = 18.5^{\circ}$, c = 325 psf, 3H:1V slope

Downstream slope: trench drain, no berms, $\phi = 18.5$, c = 325 psf

The factors of safety calculated were 1.56 for the upstream slope and 1.61 for the downstream slope. They are considered adequate according to the Recommended Guidelines for Phase I Inspections.

6.3 Post Construction Changes

There have been no known changes to any of the embankments or structures at this dam.

6.4 Seismic Stability

The dam is located in Seismic Zone No. 2 and, in accordance with the recommended Phase I guidelines, a seismic stability analysis is not warranted.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and visual inspections of the Ischua Creek Watershed Dam No. 2 and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam and its appurtenances are considered to be in good condition at the present time.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would not be overtopped for the spillway design flood of the full PMF. The principal and auxiliary spillway capacities are, therefore, judged as adequate.

b. Adequacy of Information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for Additional Investigations

It is recommended that the services of a qualified registered professional engineer be retained to evaluate:

a. the drainage gullies across the emergency spillway and those emanating from the downstream east toe of the embankment and make recommendations for remedial measures.

b. the bulge or slough in the upper portion of the downstream east slope and make recommendations for remedial measures.

7.2 RECOMMENDED MEASURES

a. The results of the aforementioned investigations will determine the appropriate remedial actions required.

b. Construct a gate well for the drain gate, extend the gate stem to the top of the riser structure and install rungs on the riser structure to provide access.

c. Debris and vegetation should be cleared from the trash racks, downstream channel, outlet basin, auxiliary spillway channel and embankment surfaces periodically. A program of periodic mowing and cutting of the embankment and outlet channels should be provided.

d. Provide a program of periodic inspection and maintenance of the dam and appurtenances, including yearly operation and lubrication of the gate systems. Document this information for future reference.

e. Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Ischua Creek Watershed Dam No. 2

Fed. I.D. # NY 00560 DEC Dam No. 25C2977

River Basin Allegheny

Location: Town Farmersville County Cattaraugus

Stream Name Johnson Creek

Tributary of Ischua Creek

Latitude (N) 42° 23.5' Longitude (W) 78° 25.3'

Type of Dam Earth Embankment

Hazard Category High

Date(s) of Inspection April 2, 1981

Weather Conditions Sunny, 50°, windy

Reservoir Level at Time of Inspection Approximately 1707.2

b. Inspection Personnel Mr. Bob Farrell, Mr. Ken Avery, Mr. James Reynolds, Mr. Jeff Hardin

c. Persons Contacted (including Address & Phone No.)

U.S. Soil Conservation Service, Rm 771-Federal Bldg., 100 So. Clinton S., Syracuse, NY

State Construction Engr. Philip "Skip" Nelson 1-315-423-5502

~~Area 1 Proj. Engr. Pete Wright 1-716-343-3664 (Batavia)~~

Contracting Office (Ischua Creek Watershed) Ed Smith-contacted thru Pete Wright

d. History:

Date Constructed 1961 Date(s) Reconstructed

Designer USDA Soil Conservation Service

Constructed by Ischua Creek Small Watershed District with S.C.S.

Owner Ischua Creek County Small Watershed Protection District

2) **Embankment**

a. **Characteristics**

(1) **Embankment Material** Silty sand and gravel core, sand and gravel shells, according to plans

(2) **Cutoff Type** 14 feet wide trench cut into glacial till

(3) **Impervious Core** According to plans, it is semi-pervious silty sand and gravel

(4) **Internal Drainage System** Trench drain 4 feet wide, 80 feet downstream of centerline, gravel, some sand

(5) **Miscellaneous** Founded on glacial till

b. **Crest**

(1) **Vertical Alignment** Good

(2) **Horizontal Alignment** Good

(3) **Surface Cracks** None noted

(4) **Miscellaneous**

c. **Upstream Slope**

(1) **Slope (Estimate) (V:H)** 3 vertical to 1 horizontal

(2) **Undesirable Growth or Debris, Animal Burrows** Grass growth is heavy, debris on slope to about midheight

(3) **Sloughing, Subsidence or Depressions** None noted

(4) **Slope Protection** 10 foot wide berm at approximately waterlevel. 3 to 6 inches to wave erosion at waterline. Another berm is located at the elevation of the high stage inlet

(5) **Surface Cracks or Movement at Toe** None noted

d. **Downstream Slope**

(1) **Slope (Estimate - V:H)** 2.5 horizontal to 1 vertical

(2) **Undesirable Growth or Debris, Animal Burrows** Animal burrows approximately 100 feet and 250 feet left of right abutment at toe. Approximately 30 to 70 feet left of outlet structure and 5 more animal burrows. All are 6"-8" diameter

(3) **Sloughing, Subsidence, or Depressions** Approximately 100 feet left of outlet and 20 feet below crest is a 6 foot diameter slough which may be result of two animal burrows just above

(4) **Surface Cracks or Movement at Toe** None noted

(5) **Seepage** None noted

(6) **External Drainage System (Ditches, Trenches, Blanket)** Cobble drain along downstream toe, somewhat overgrown, generally good condition, no apparent flow

(7) **Condition Around Outlet Structure** Some erosion to the left side emanating from 4 animal burrows approximately 40 feet left of outlet.

(8) **Seepage Beyond Toe** Ground downstream to the left of the outlet structure is soggy but it is believed to be the result of natural groundwater

e. **Abutments - Embankment Contact**

Generally good condition

(1) **Erosion at Contact** None noted

(2) **Seepage Along Contact** None noted

3) **Drainage System**

(a) **Description of System** Vertical trench drain 80' downstream of the centerline draining to a rockfill drain at the downstream toe of the dam

(b) **Condition of System** System could not be observed. The condition of the dam indicates that the system is functional

(c) **Discharge from Drainage System** None apparent

) **Instrumentation** (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, etc.) None installed

) **Reservoir**

a. **Slopes** Appear stable and in good condition. Shallow sloping woodland

b. **Sedimentation** Not measured

c. **Unusual Conditions Which Affect Dam** None apparent

) **Area Downstream of Dam**

a. **Downstream Hazard (No. of homes, highways, etc)** See Table 5-1

b. **Seepage, unusual growth** No seepage noted

c. **Evidence of movement beyond toe of Dam** None noted

d. **Conditions of Downstream Channel** Stable, narrow channel over rolling terrain

7) Spillway(s) (including Discharge Conveyance Channel)

Generally good condition with the exception of erosion gullies at upstream end and animal burrows in diversion dikes

a. General Drainage gullies up to 3 ft. deep emanating from natural ground and crossing the upstream channel of the emergency spillway. Three (3) animal burrows in left dike.

b. Condition of Service Spillway Good; no evidence of spalling, cracking or efflorescence

c. Condition of Auxiliary Spillway Generally good; erosion gullies should be repaired and possibly a drainage path provided for the natural groundwater flow.

d. Condition of Discharge Conveyance Channel Generally good at the present time.

3) Reservoir Drain/Outlet

Type: Pipe X Conduit _____ Other _____

Material: Concrete _____ Metal X Other _____

Size: 8" Length 40'

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable X

Material: _____

Joints: _____ Alignment _____

Structural Integrity: _____

Hydraulic Capability: _____

Means of Control: Gate _____ Valve X Uncontrolled _____

Operation: Operable _____ Inoperable _____ Other _____

Present Condition (Describe): No handle. Gate valve stem does not appear to extend to top of riser.

9) Structural

a. Concrete Surfaces N/A

b. Structural Cracking N/A

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments N/A

e. Drains - Foundation, Joint, Face N/A

f. Water Passages, Conduits, Sluices N/A

g. Seepage or Leakage N/A

h. Joints - Construction, etc. N/A

i. Foundation N/A

j. Abutments N/A

k. Control Gates N/A

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool,etc) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

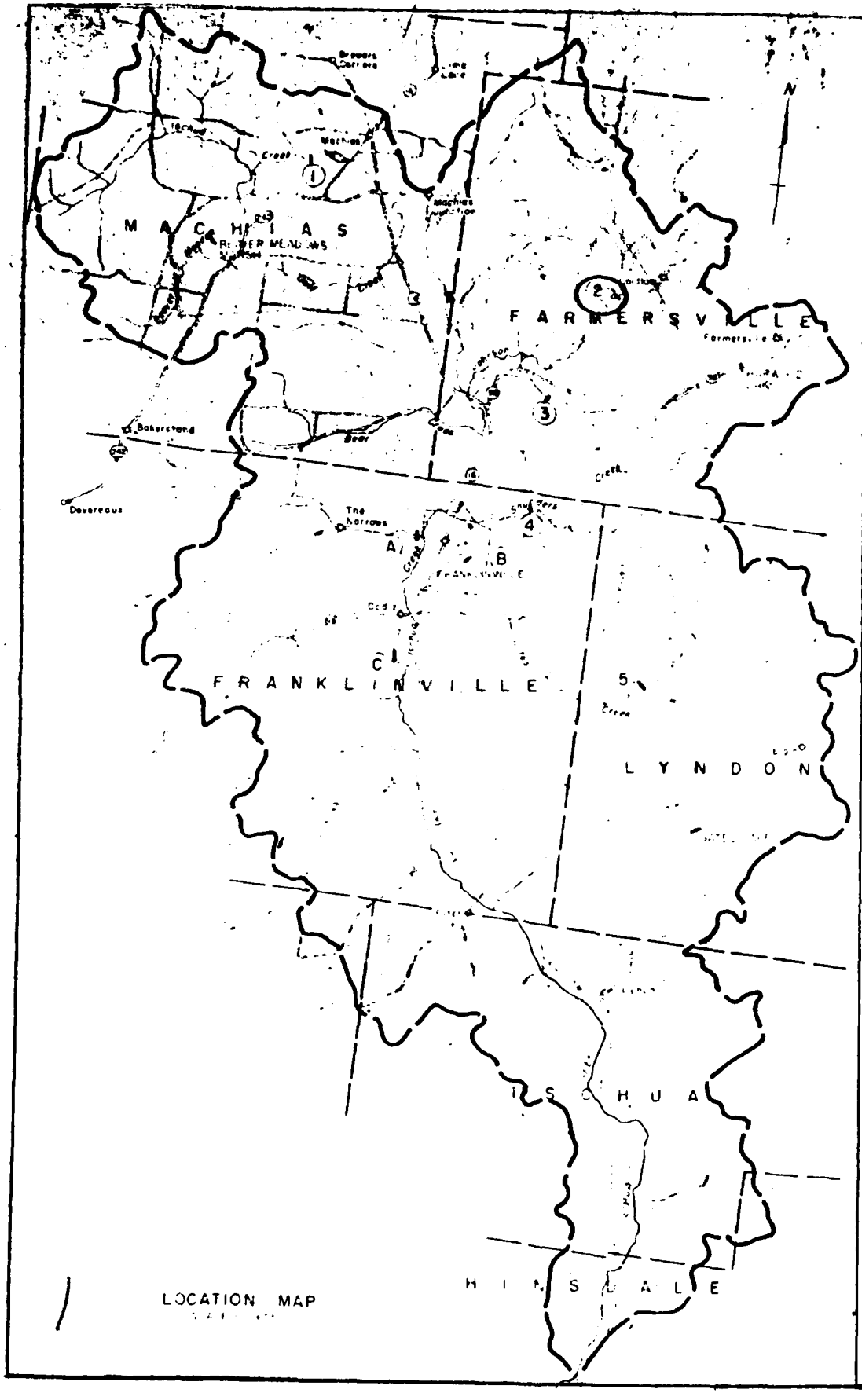
0) Appurtenant Structures (Power House, Lock, Gatchouse, Other)

a. Description and Condition None

APPENDIX B

ENGINEERING DATA

APPENDIX B



ISCHUA

FLO

DRAINAGE
TOTAL S
WATER S
HEIGHT O
VOLUME

BUILT U

ISC

SHEET 1 COVER SHEE
SHEET 2 PLAN OF ST
SHEET 3 DAMSITE
SHEET 4 PROFILES
SHEET 5 SEEPAGE DR
SHEET 6 PLAN - PROF
SHEET 7 RISER DETA
SHEET 8 CRADLE, CO
SHEET 9 GATE WELL

ISCHUA CREEK WATERSHED PROJECT

FLOODWATER RETARDING DAM NO. 2

DRAINAGE AREA	1792	Acres
TOTAL STORAGE	465	Acre ft.
WATER SURFACE AREA	6.5	Acres
HEIGHT OF DAM	38	Feet
VOLUME OF FILL	138,749	Cubic Yards

BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

by

ISCHUA CREEK SMALL WATERSHED DISTRICT

with the assistance of

SOIL CONSERVATION SERVICE

of the

U S DEPARTMENT OF AGRICULTURE

AS BUILT

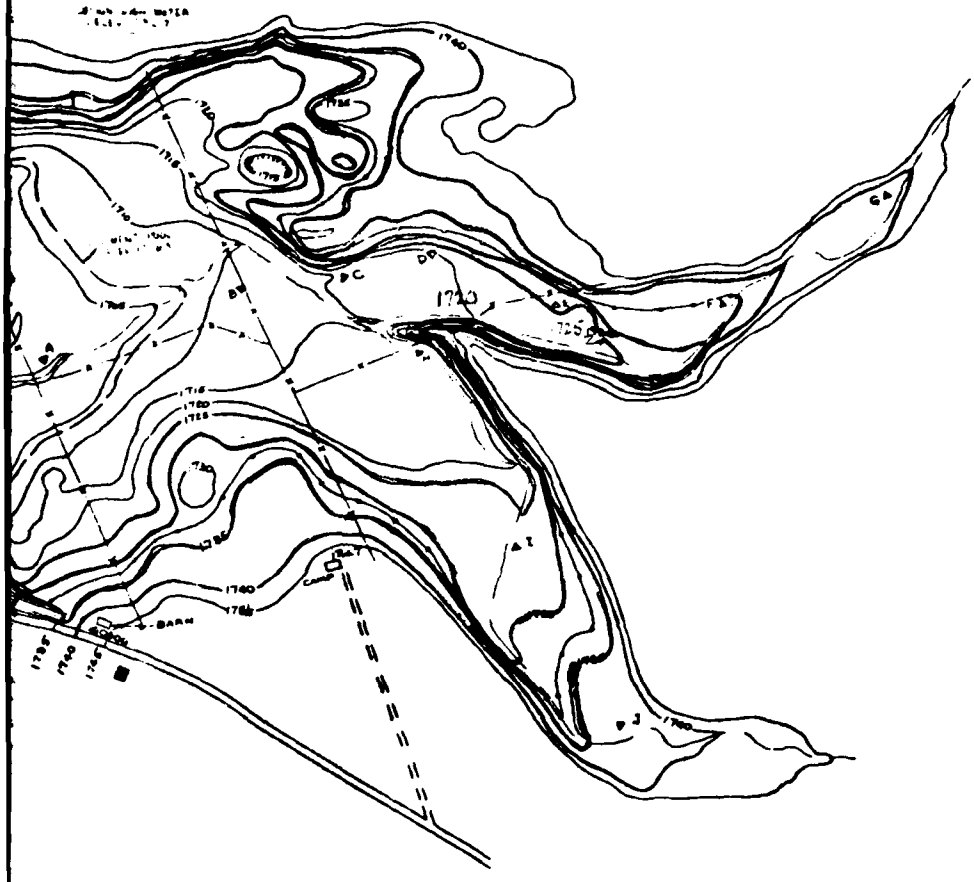
ISCHUA CREEK WATERSHED
JOHNSON SEEP
LAIDLAW, NEW YORK
COVER SHEET

U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

H.L. WALL	Mar '61	
V.S.P. [illegible]	Apr '61	
N.P.S.WES	Apr '61	BC2

B-2

PRINCIPAL SPILLWAY
BARN
N



SCALE 1" = 400'

AS BUILT

SCALE 1" = 200' CONTOUR INTERVAL 5'

TOP OF DAM	ELEV. 1725.5
SEDIMENT POOL	ELEV. 1700.0
CREST OF PRINCIPAL SPWY	ELEV. 1715.8
CREST OF EMERG. SPWY	ELEV. 1725.5
FEDERAL HIGH WATER	ELEV. [illegible]

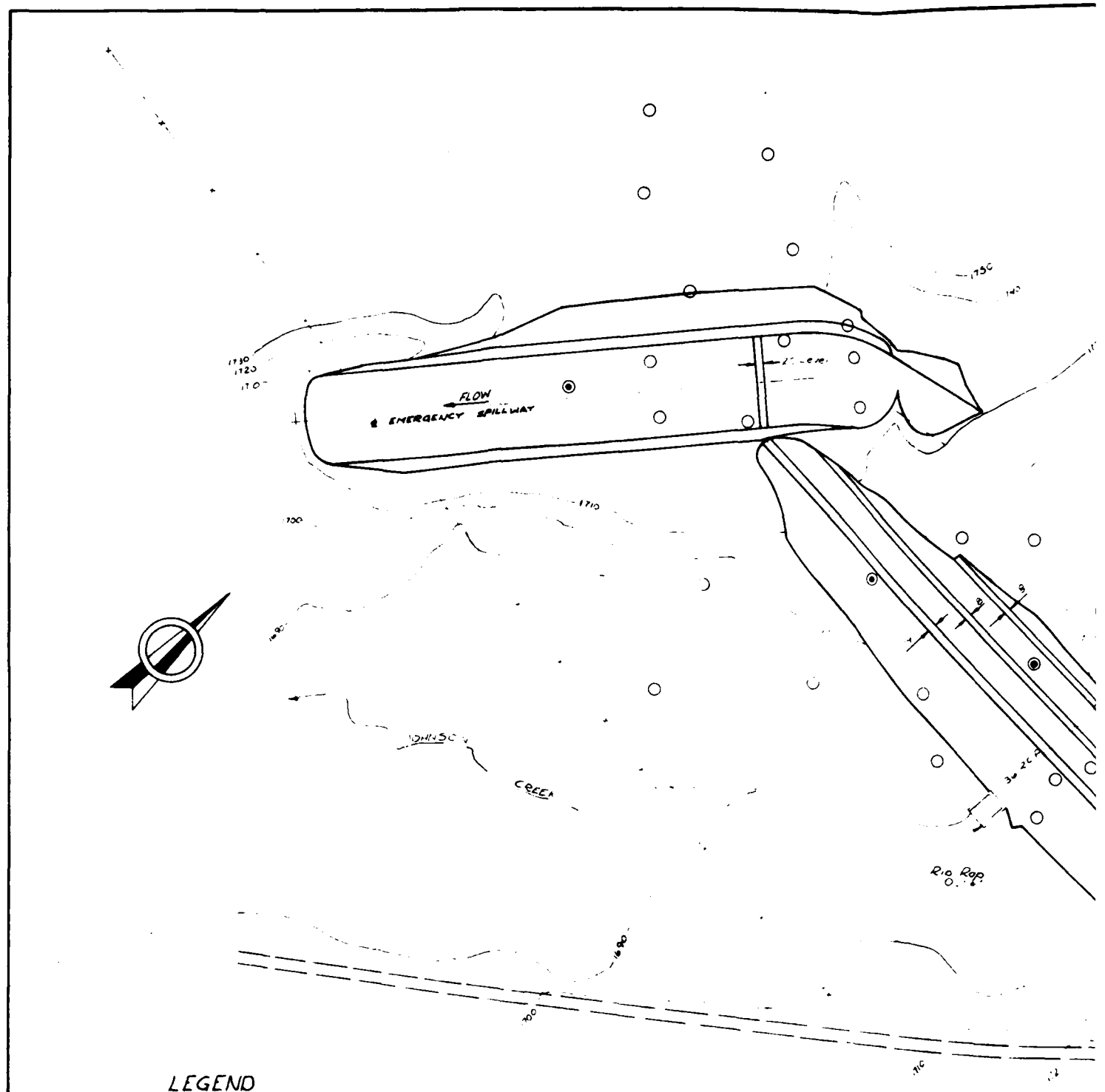
ISCHUA CREEK WATERSHED
FLOODWATER RETARDING DAM
JOHNSON CREEK
LAIDLAW, NEW YORK
PLAN OF STORAGE AREAS

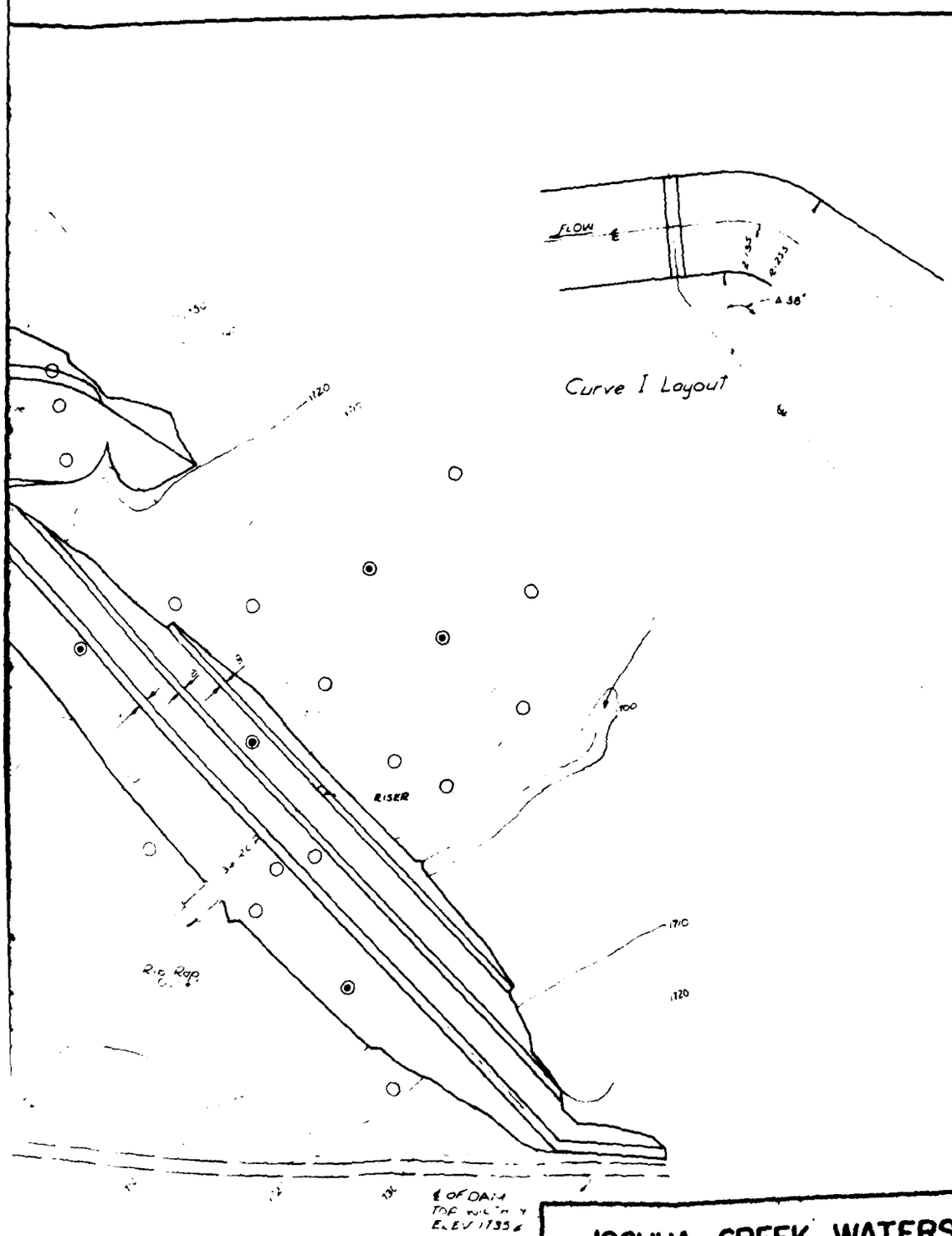
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J.D. TYLER	Date Sept '60	Approved by Title	
Drawn J.D. TYLER	Sept '60	Title	
Traced T.S.D.	Nov '60	Sheet No. 2 of 9	Drawing No. NY-8-2-F
Checked N.F.S. MFS	Apr '61		

2

As built Plans


FLOW
EMERGENCY SPILLWAY
CREEK
Rip Rap
LEGEND
Fence Line
Stream
Contour Line
Road
Test pit or drill hole (Sampled)
Test pit or drill hole



ISCHUA CREEK WATERSHED DAM #2

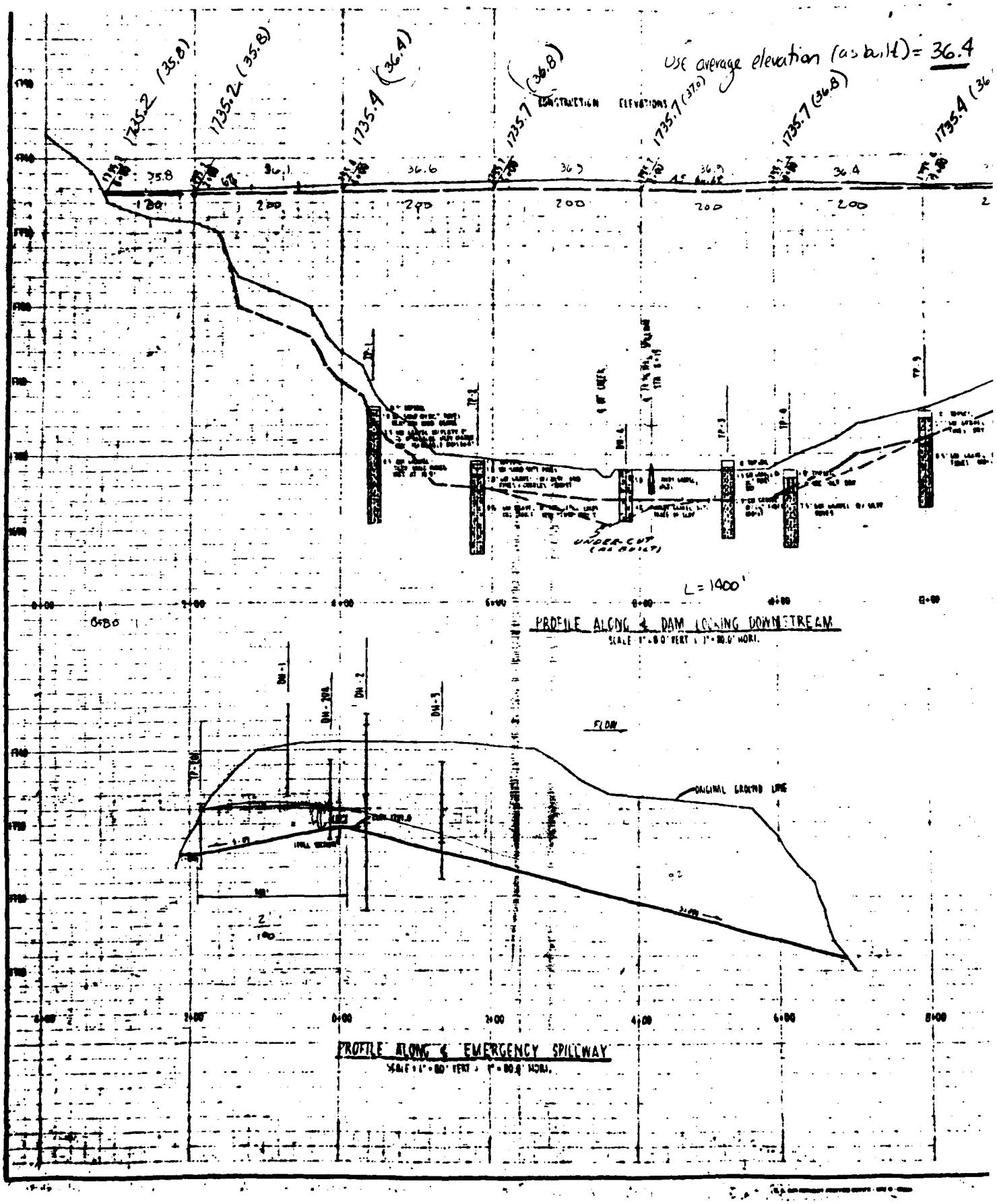
NY00560

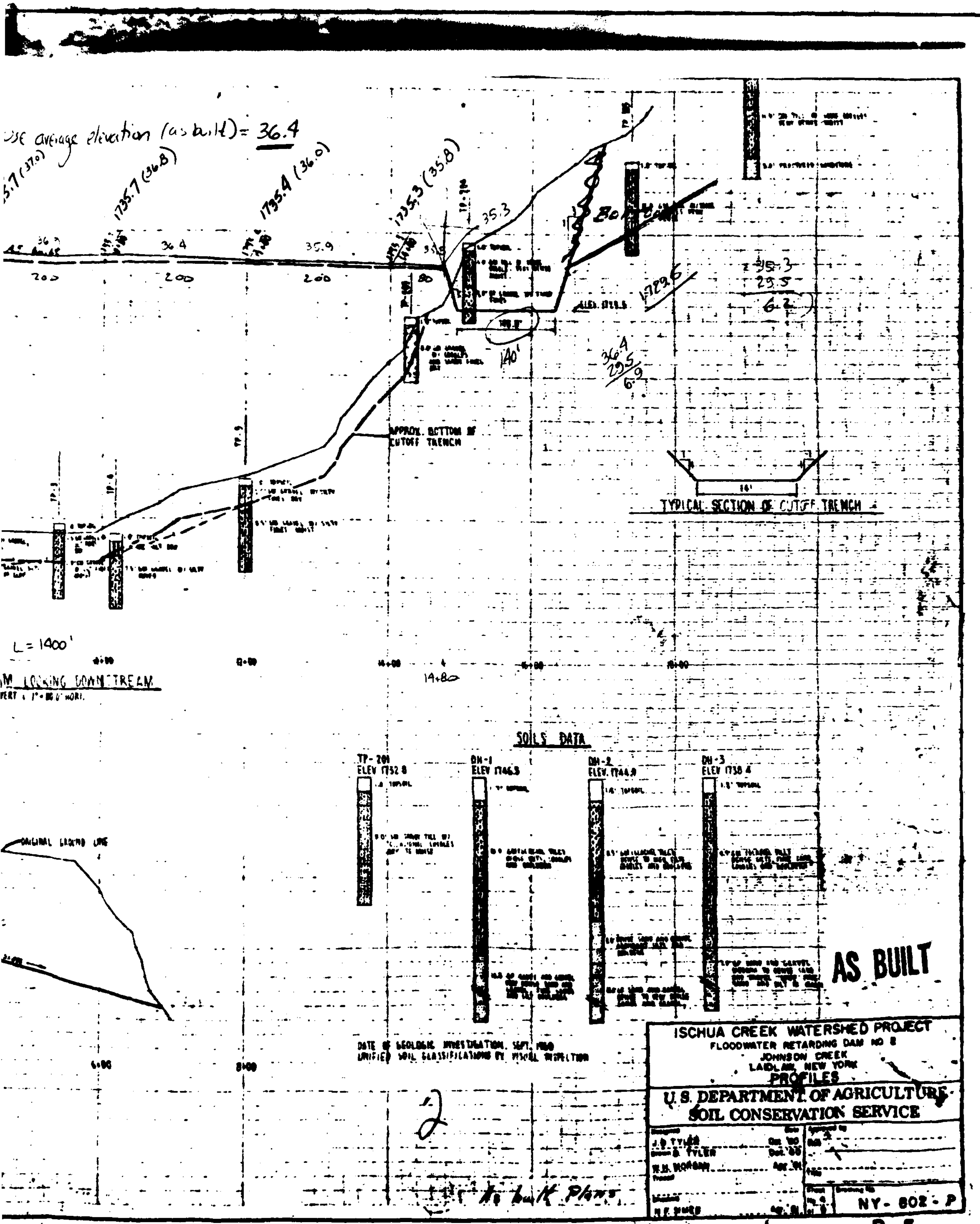
SITE PLAN

ERDMAN, ANTHONY, ASSOCIATES
CONSULTING ENGINEERS & PLANNERS

DATE
MAY 1981

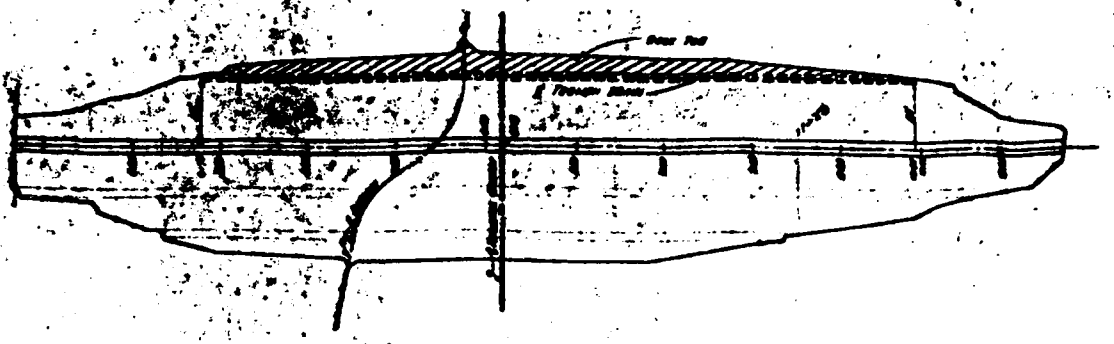
B-4


Use average elevation (as built) = 36.4
1735.2 (35.8)
1735.2 (35.8)
1735.4 (36.4)
1735.7 (36.8)
CONSTRUCTION ELEVATIONS
1735.7 (37.0)
1735.7 (36.8)
1735.4 (36
35.8
36.1
36.6
36.3
36.4
36.4
100'
200'
200'
200'
200'
200'
TP-1
TP-2
TP-3
TP-4
TP-5
DN-1
DN-2
DN-3
DN-2A
4' OF COVER
UNDER-CUT (AS REQUIRED)
L = 1400'
6+80
PROFILE ALONG ℄ DAM LOOKING DOWNSTREAM
SCALE 1" = 80' VERT. & 1" = 80.0' HORI.
FLOW
ORIGINAL GROUND LINE
PROFILE ALONG ℄ EMERGENCY SPILLWAY

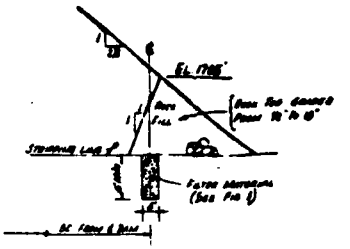


use average elevation (as built) = 36.4
1735.7 (36.8)
1735.4 (36.0)
1735.3 (35.8)
APPROX. BOTTOM OF CUTOFF TRENCH
TYPICAL SECTION OF CUTOFF TRENCH
L = 1400'
14+80
140'
36.4
29.5
6.9
35.3
29.5
6.2
1729.6
SOILS DATA
TP-201
DH-1
DH-2
DH-3
ORIGINAL GROUND LINE
AS BUILT
DATE OF GEOLOGIC INVESTIGATION, SEPT. 1960
UNIFIED SOIL CLASSIFICATIONS BY VISUAL INSPECTION
ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 8
JOHNSON CREEK
LAIDLAW, NEW YORK
PROFILES
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NY-802-P
As built Plans

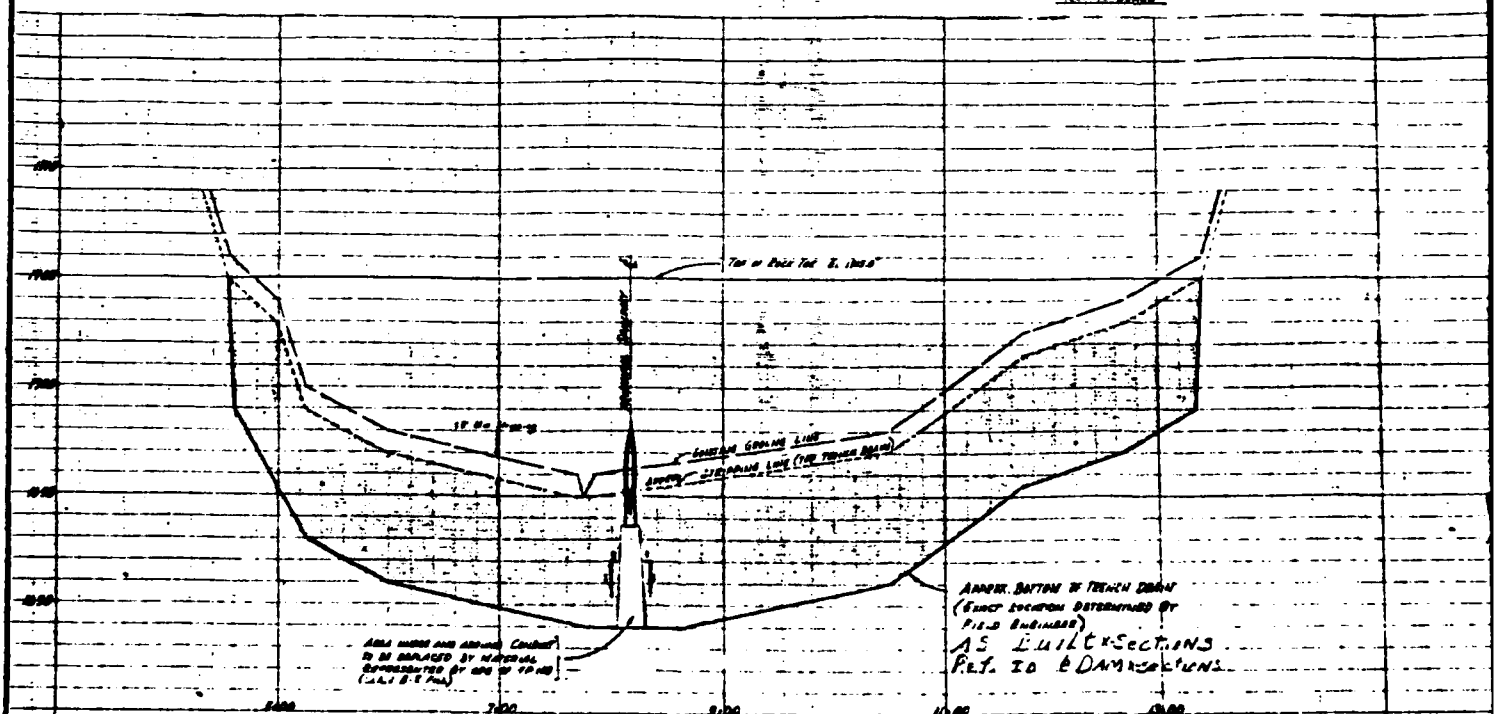
B-5



PLAN VIEW
SCALE 1"=100'



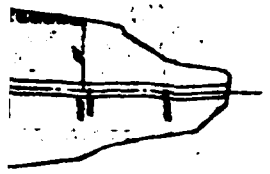
TYPICAL SECTION OF ROCK TOE & TRENCH DRAIN
NOT TO SCALE

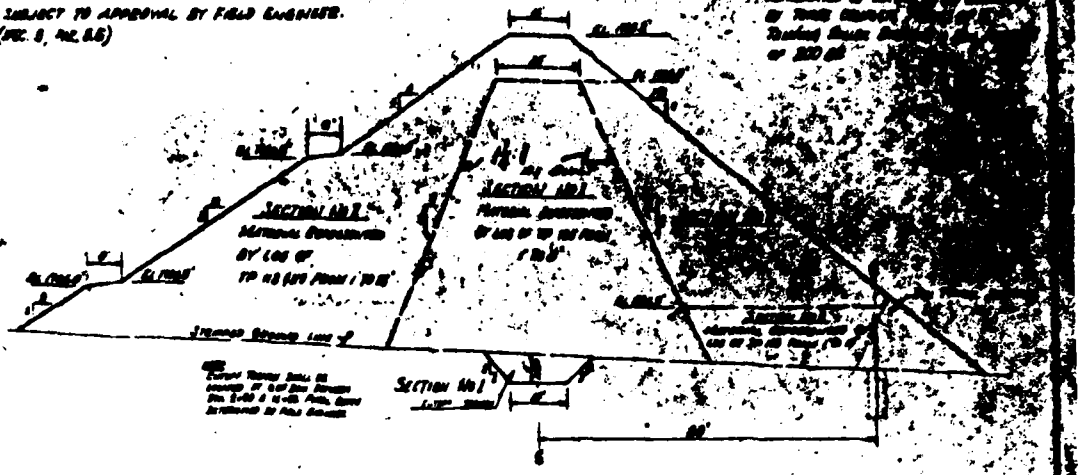


PROFILE ALONG ℄ TRENCH DRAIN
SCALE HOR. 1"=80'
VERT. 1"=8'

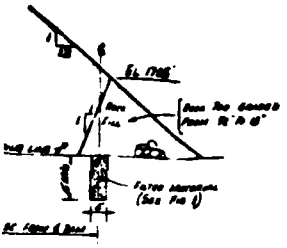
NOTE SECTION NO 1 CORE LINES ARE APPROX.
FINAL LOCATION DETERMINED BY FIELD BOARD.

THE SUITABILITY OF MATERIALS AND THEIR DISPOSITION IN THE FILL SHALL AT ALL TIMES BE SUBJECT TO APPROVAL BY FIELD ENGINEER.
(SEC. 8, PAR. 8.5)





TYPICAL SECTION OF FILL
NOT TO SCALE

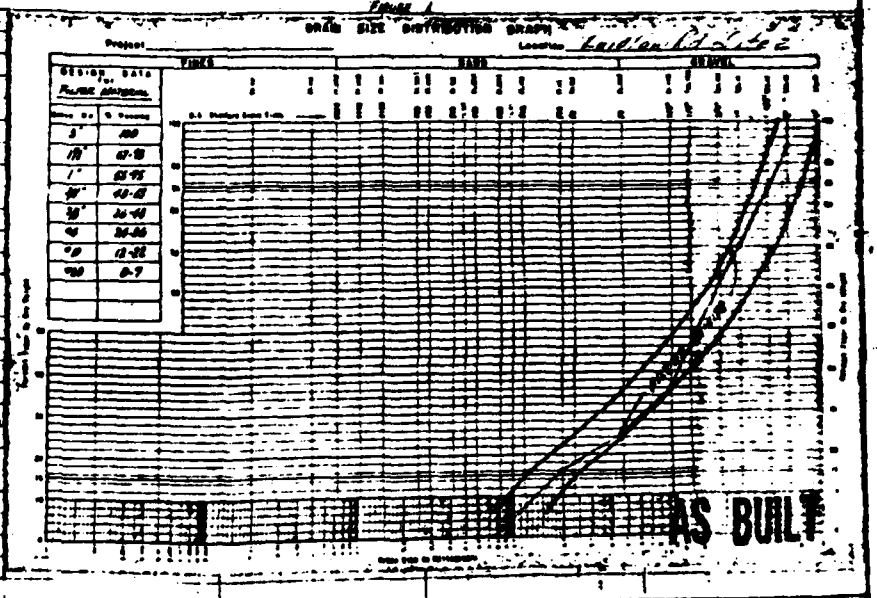


SECTION OF ROCK TOE & TRENCH DRAIN
NOT TO SCALE

AS BUILT

BOTTOM OF TRENCH DRAIN
LOCATION DETERMINED BY
ENGINEER)

AS BUILT SECTIONS
NO 2 DAM SECTIONS



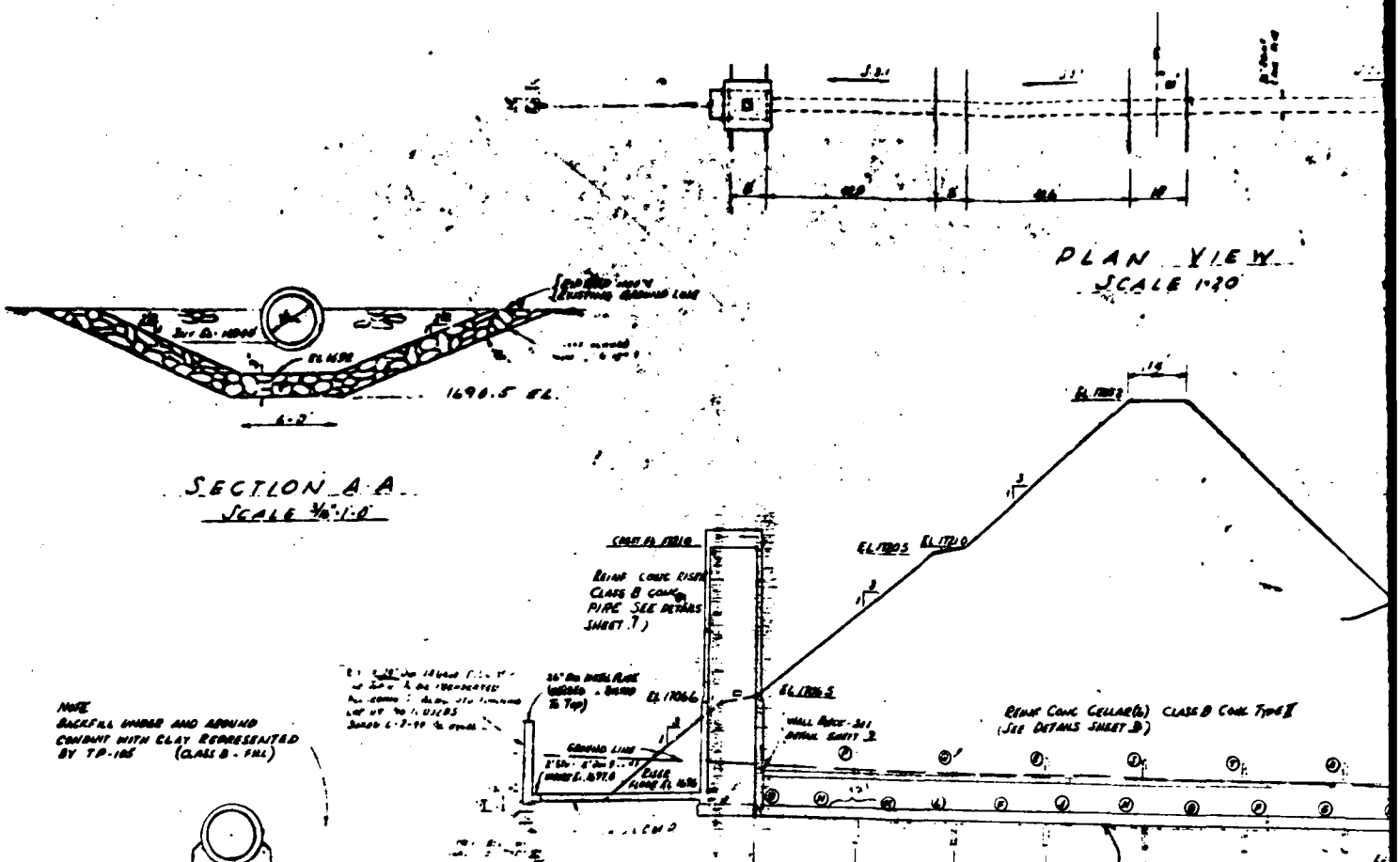
AS BUILT

ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
JOHNSON CREEK
LAIDLAW, NEW YORK
SEEPAGE DRAIN DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed N F SIMES	Date Mar '61	Approved By Title	
Traced G C ELIAS	Apr '61	Date	
Checked S ROSS, ER	Apr '61	Sheet No 5 of 9	Drawing No NY - 802 - P

As built plans

B-6



PLAN VIEW
SCALE 1"=40'

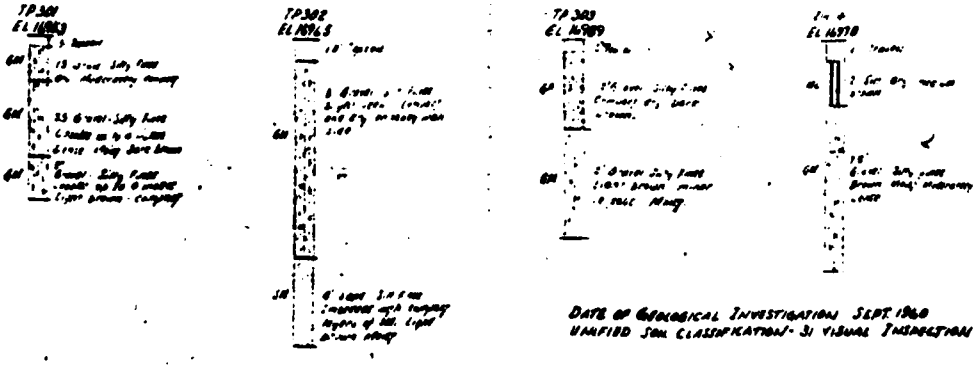
SECTION A-A
SCALE 3/16"=1'-0"

TYPICAL SECTION
PRINCIPAL SPILLWAY EXCAVATION

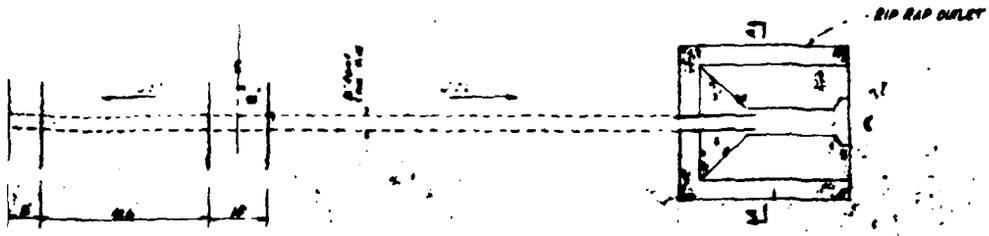
PROFILE ALONG ℄ PRINCIPAL
SCALE HOR 1"=20'
VERT 1"=8'

SEE SHEETS 6A-
Profile and X-Sec

SOILS DATA



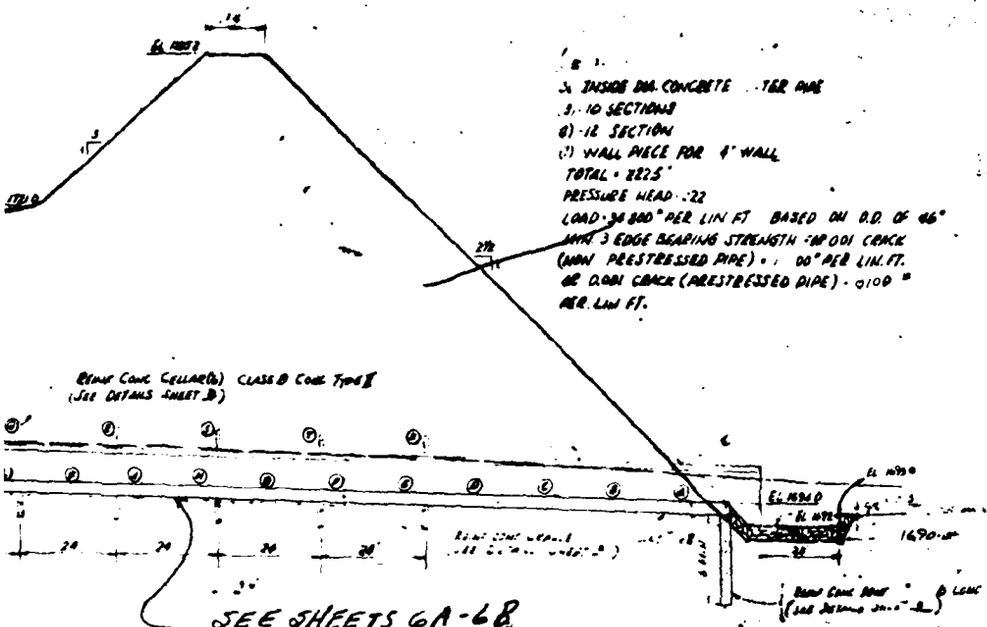
DATE OF GEOLOGICAL INVESTIGATION SEPT. 1960
UNIFIED SOIL CLASSIFICATION - BY VISUAL INSPECTION



PLAN VIEW
SCALE 1:20

	OUTLET OF 36" PIPE	INVERT OF 36" PIPE
A		1694.38
B	32	1694.33
C	48	1693.86
D	64	1693.09
E	80	1692.05
F	96	1690.92
G	112	1689.57
H	127	1688.63
J	144	1687.76
K	160	1687.33
L	176	1687.06
M	192	1686.93
N	209	1686.98
O	226	1687.00
P	1979	1692.97
Q		1692.88
R	1996	1692.74
S	1856	1691.68
T	1013	1693.96
U	5	1692.28

* NOTE, PIPE LENGTHS ARE NOMINAL AND DO NOT INCLUDE CREEP.



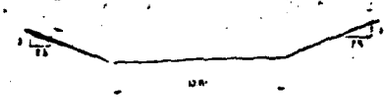
1. INSIDE DIA. CONCRETE PIPE
2. 10 SECTIONS
3. 12 SECTION
4. WALL PIECE FOR 4" WALL
TOTAL = 2225'
PRESSURE HEAD = 22'
LOAD = 34 800 # PER LIN FT BASED ON O.D. OF 46"
WITH 3 EDGE BEARING STRENGTH = 1800 # CRACK
(NON PRESTRESSED PIPE) = 1200 # PER LIN. FT.
OR 0.001 CRACK (PRESTRESSED PIPE) = 0100 #
PER LIN FT.

Reinf Conc Cellar(a) Class B Conc Type II
(See Details Sheet B)

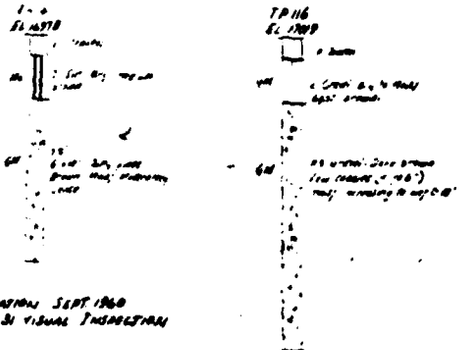
SEE SHEETS 6A-6B
Profile and X-Sections

& ALONG ℄ PRINCIPAL SPILLWAY

SCALE HOR 1"=20'
VERT 1"=8'



TYPICAL OUTLET
CHANNEL SECTION



INVESTIGATION SEPT 1960
ATION - BY VISUAL INSPECTION

2

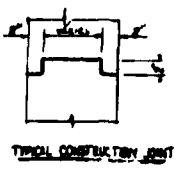
AS BUILT

ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
JOHNSON CREEK
LAIDLAW, NEW YORK
PLAN-PROFILE OF PRINCIPAL SPILLWAY
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

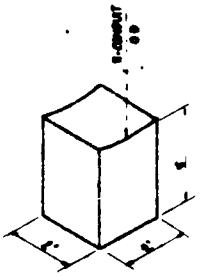
H L WALL — Mar '61
G C ELIAS — Apr '61
N F S U E S — Apr '61

NY-802-P

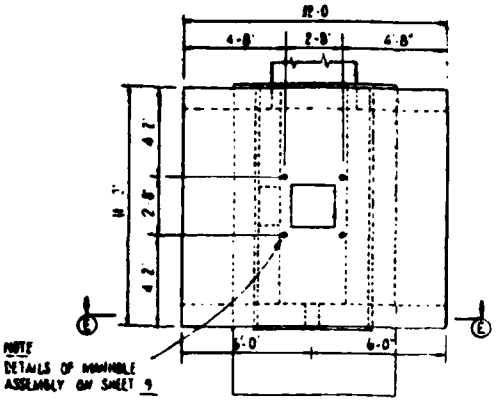
B-7



TYPICAL CONSTRUCTION JOINT

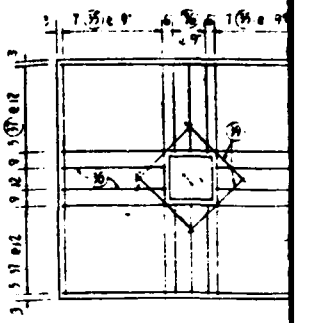


CONCRETE CONDUIT SUPPORT BLOCK

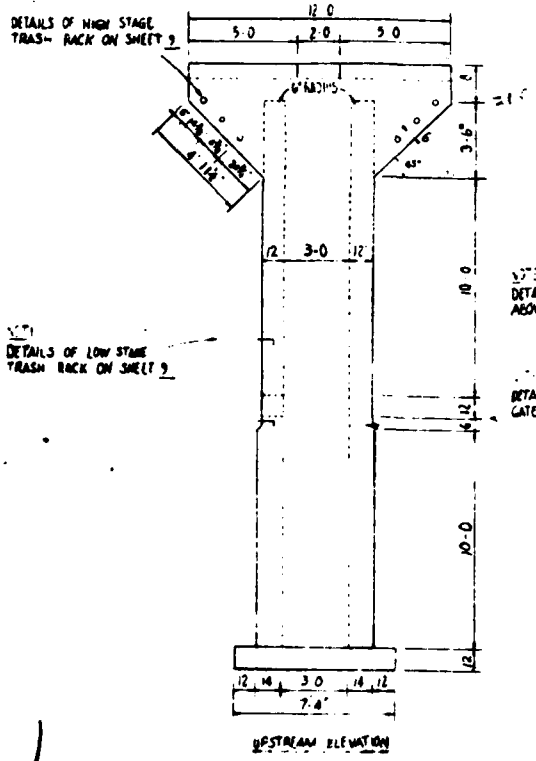


PLAN VIEW

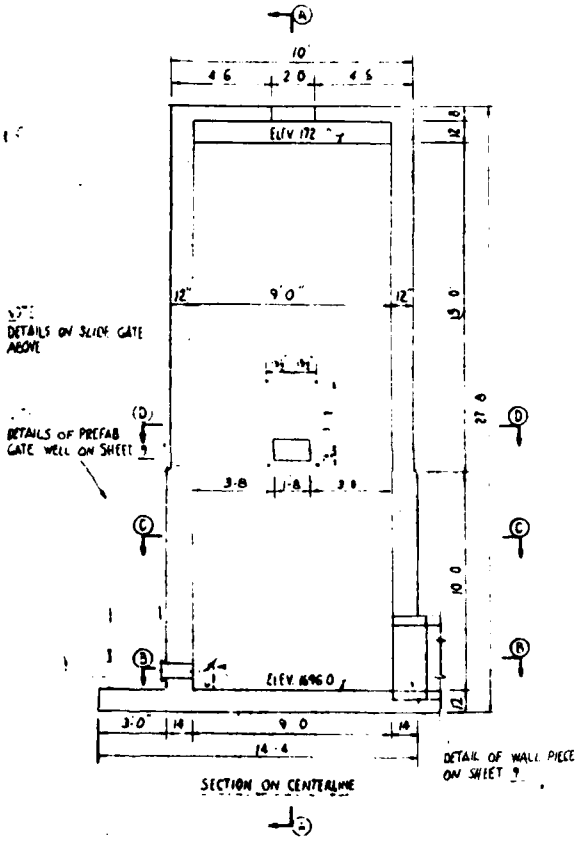
SLIDE GATE DETAILS
8 SLIDE GATE ARMCO MODEL DIC OR APPROVED EQUAL
REMOVABLE LIFT-HOD
OPERATING HEAD 10 FEET
STEM LENGTH . FEET
FRAME HEIGHT MINIMUM
BRONZE SEAT FACINGS · LIFT NUTS
LOCATE ANCHOR BOLTS ACCORDING TO MANUFACTURERS RECOMMENDATIONS



TOP SLAB

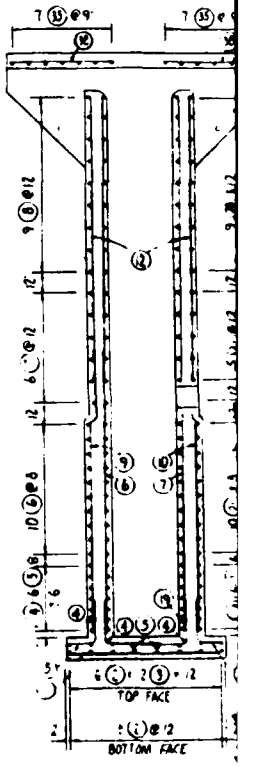


UPSTREAM ELEVATION

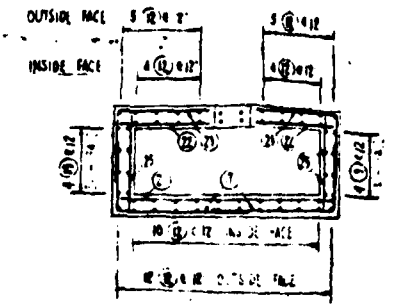


SECTION ON CENTERLINE

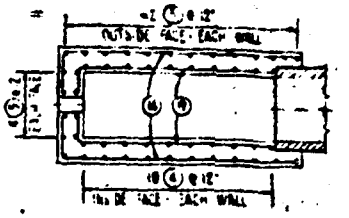
DETAIL OF WALL PIECE ON SHEET 9



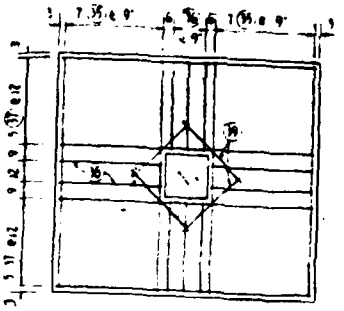
SECTION AA



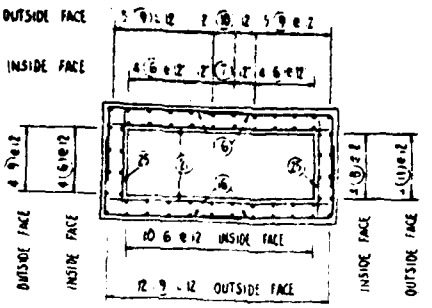
SECTION D-D



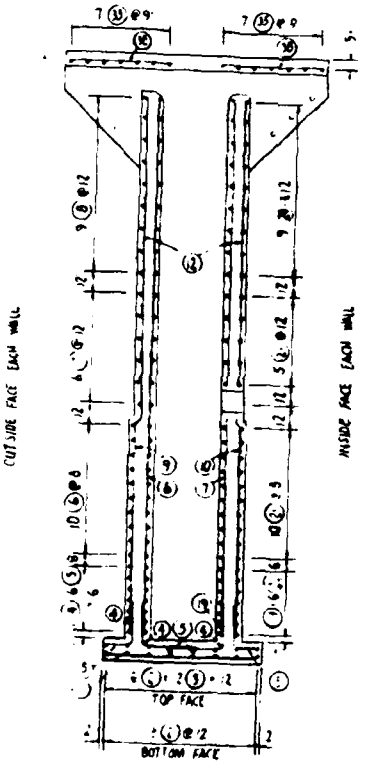
SECTION B-B



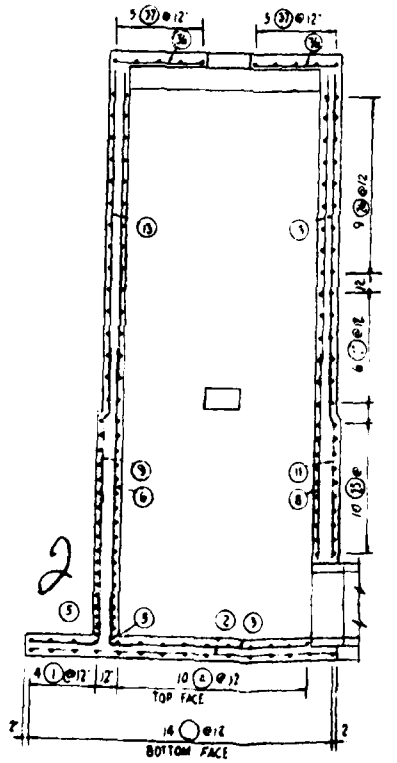
TOP SLAB



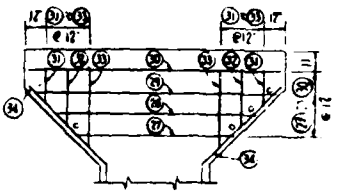
SECTION C-C



SECTION A-A



SECTION ON CENTERLINE As built plan



SECTION E-E

AS BUILT

ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
JOHNSON CREEK
LAIDLAW, NEW YORK
RISER DETAILS

U.S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY- 802

B-8

STEEL SCHEDULE

MARK	LOCATION	NUMBER	SIZE	LENGTH	TYPE	A	B	L	TOTAL FT.
1	[illegible]	16	8	7-8	1	—	—	—	126.00
2	" "	14	8	12-8	1	—	—	—	191.00
3	" "	2	5	12-9	1	—	—	—	22.50
4	" "	20	5	4-6	2	2-0	4-6	—	90.00
5	" "	22	5	3-0	2	2-0	1-0	—	99.00
6	WALLS, WEST	24	5	15-0	1	—	—	—	288.00
7	" "	2	5	10-5	1	—	—	—	20.80
8	" "	4	5	9-6	1	—	—	—	38.00
9	" "	26	6	15-0	4	9-9	0-9	3-0	390.00
10	" "	2	5	10-5	4	9-9	0-9	0-3	20.80
11	" "	4	5	9-6	4	6-3	0-3	3-0	38.00
12	" "	44	5	15-2	1	—	—	—	669.00
13	" "	10	5	14-5	1	—	—	—	72.00
14	WALLS, NORTH	2	8	12-11	2	1-0	1-0	—	77.85
15	" "	12	6	14-9	2	1-0	3-9	—	177.00
16	" "	40	6	9-10	2	6-3	3-9	—	395.35
17	" "	81	6	9-6	2	6-3	3-3	—	769.06
18	" "	98	5	9-2	2	6-3	3-0	—	930.83
19	" "	2	6	10-3	2	9-0	1-3	—	20.33
20	" "	12	6	11-8	2	9-0	3-8	—	46.00
21	" "	91	6	10-6	1	—	—	—	957.50
22	" "	1	6	8.3	1	—	—	—	8.50
23	" "	2	6	7-6	2	4-3	3-3	—	17.50
24	" "	18	6	10-6	1	—	—	—	189.00
25	" "	32	6	4-6	1	—	—	—	144.00
26	" "	18	6	4-6	1	—	—	—	81.00
27	ANTI-SPLITTER	4	5	7-3	1	—	—	—	29.00
28	" "	4	5	9-2	1	—	—	—	37.00
29	" "	4	5	11-3	1	—	—	—	45.00
30	" "	4	5	11-8	1	—	—	—	46.33
31	" "	3	5	7-8	1	—	—	—	15.00
32	" "	8	5	9-6	1	—	—	—	76.00
33	" "	8	5	9-6	1	—	—	—	28.00
34	" "	8	5	5-0	1	—	—	—	40.00
35	TOP SLAB	14	5	10-6	1	—	—	—	127.00
36	" "	6	5	4-0	1	—	—	—	24.00
37	" "	10	5	11-6	1	—	—	—	115.00
38	" "	4	5	4-6	1	—	—	—	18.00
39	" "	4	5	4-0	1	—	—	—	16.00
40	CRADLE & BENT	96	4	8-3	1	—	—	—	797.00
41	" "	60	4	1-6	1	—	—	—	90.00
42	" "	24	4	10-6	1	—	—	—	252.00
43	" "	60	4	7-6	1	—	—	—	150.00
44	" "	24	4	4-6	1	—	—	—	108.00
45	CRADLE	213	4	5-0	5	1-0	5-0	1-0	1065.00
46	" "	48	4	15-6	1	—	—	—	744.00
47	" "	4	4	11-6	1	—	—	—	46.00
48	" "	4	4	8-3	1	—	—	—	33.00
49	BENT	14	4	7-6	1	—	—	—	105.00
50	" "	4	4	7-0	1	—	—	—	28.00
51	" "	6	4	6-3	1	—	—	—	37.50
52	" "	6	4	5-6	1	—	—	—	33.00

STEEL

*4 BARS [illegible] LIN FT [illegible] LB

*5 BARS 3267.50 LIN FT 3401.8 LBS

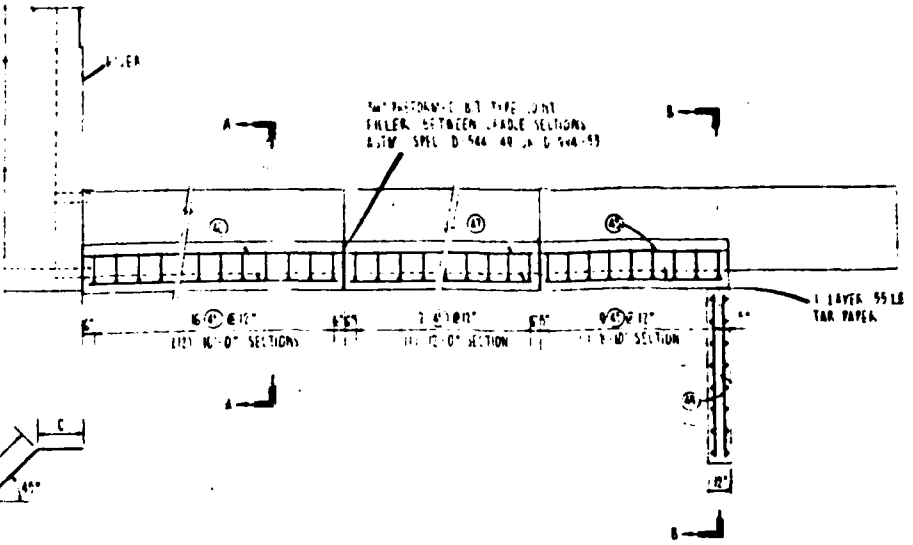
*6 BARS 1454.50 LIN FT 1464.7 LBS

TOTAL 7563.8 LBS

CONCRETE

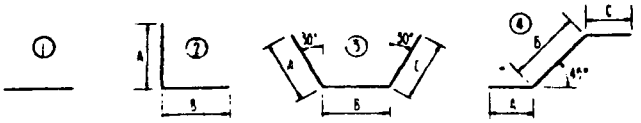
CLASS "B" TYPE I 36.6 CU YDS

CLASS "B" - TYPE II 66.7 CU YD.



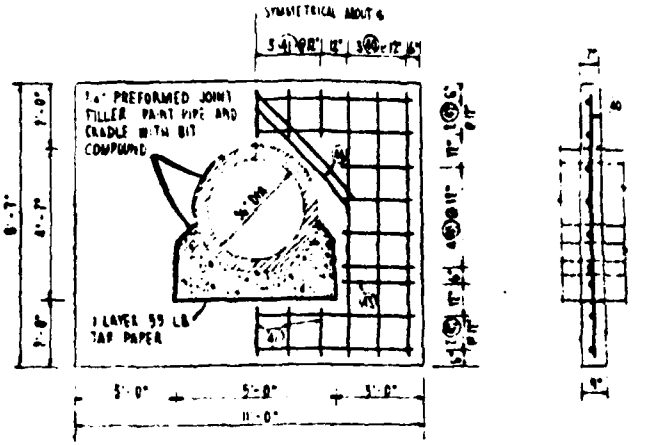
DETAIL OF REINFORCED CONCRETE CRADLE AND BENT

BAR TYPES



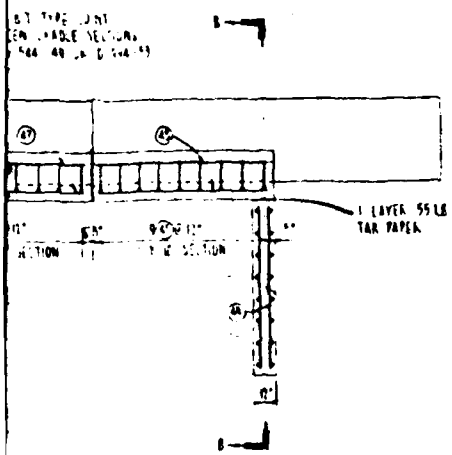
GENERAL NOTES:

1. ALL CONCRETE SHALL BE CLASS "B" AND OF THE TYPE NOTED.
2. PORTLAND CEMENT TYPE I WITH AN AIR-ENTRAINING ADMIXTURE (A TYPE 'A') SHALL BE USED.
3. ALL REINFORCING STEEL TO BE LAPPED 30 BAR DIAMETERS (MIN)
4. ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" CLEAR COVER. WHERE FORMS ARE USED BARS SHALL HAVE A MINIMUM OF 2" CLEAR COVER
5. ALL EXPOSED EDGES OF CONCRETE TO HAVE A ¾" CHAMFER UNLESS OTHERWISE NOTED

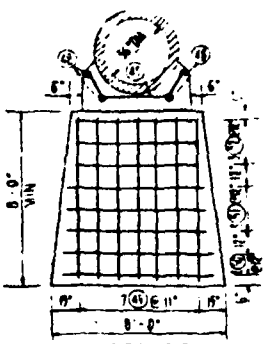


DETAIL OF REINFORCED CONCRETE ANTI-SEEP COLLAR - 6 REQ.

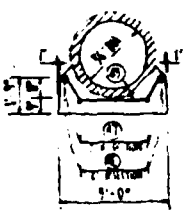
SCALE: 3/8" = 1'-0"


1 LAYER 55 LB TAR PAPER

RETE CRADLE AND BENT



SECTION B-B



SECTION A-A

AS BUILT

ES:
SHALL BE CLASS "B" AND OF THE TYPE

ENT TYPE I WITH AN AIR-ENTRAINING
TYPE IA SHALL BE USED

NG STEEL TO BE LAPPED 30 BAR
MIN.)

NG STEEL PLACED IN CONCRETE POURED
AGAINST ALL SURFACES WHICH WILL BE EXPOSED
WHERE FORMS ARE USED BARS SHALL HAVE
2" CLEAR COVER

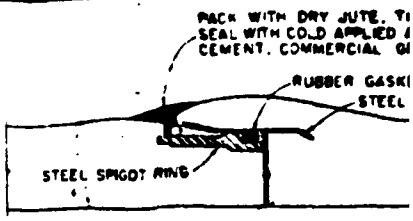
EDGES OF CONCRETE TO HAVE A 3/4"
RS OTHERWISE NOTED

2

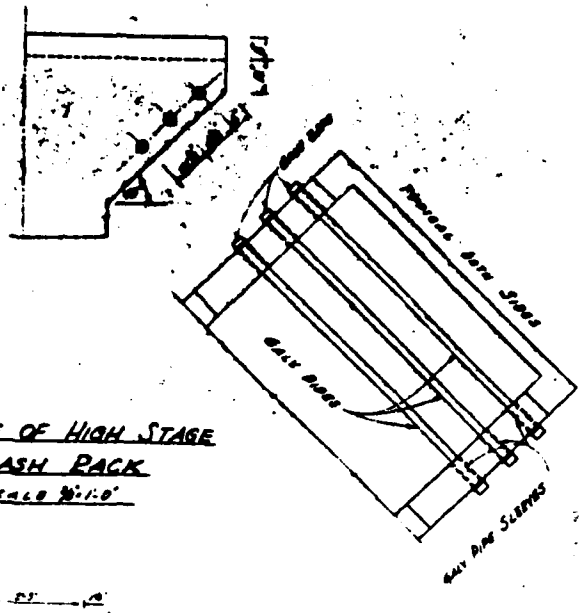
ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
JOHNSON CREEK
LAIDLAW, NEW YORK
CRADLE COLLARS & BENT DETAILS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	W.L.WELL	Mar. '61	Approved for:
Drawn	W.K. MERRIAM	Apr. '61	Title:
Traced			Date:
Checked	L.E. BECK	Apr. '61	Sheet No. 8 of 9 Drawing No. NY-802-P

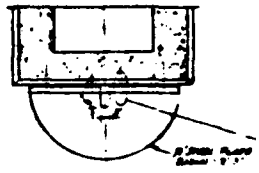
B-9



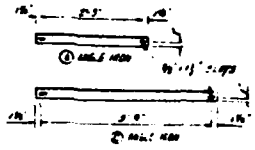
DETAIL OF REINFORCED
CONCRETE WATER PIPE JO

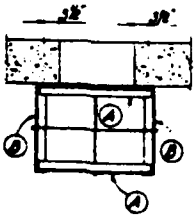


DETAILS OF HIGH STAGE
TRASH RACK
SCALE 3/8"=1'-0"

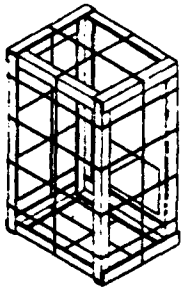


SECTION D-D

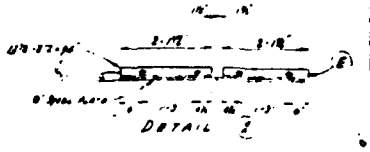


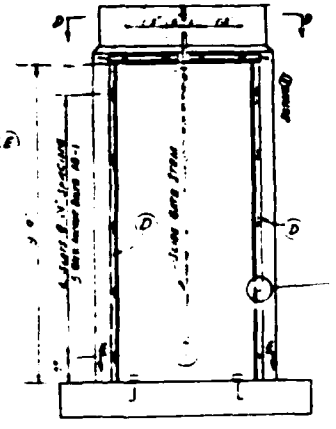


SECTION A-A

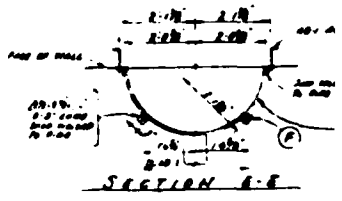


ISOMETRIC



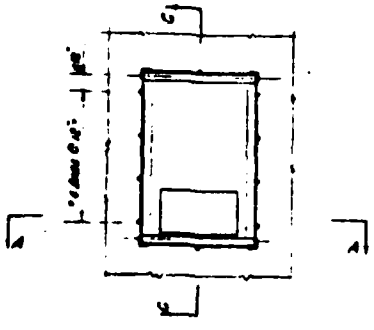


ELEVATION

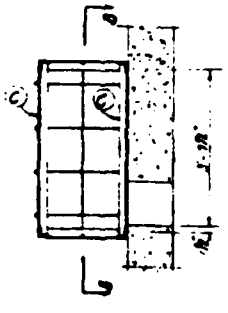


SECTION E-E

DETAILS OF GATE



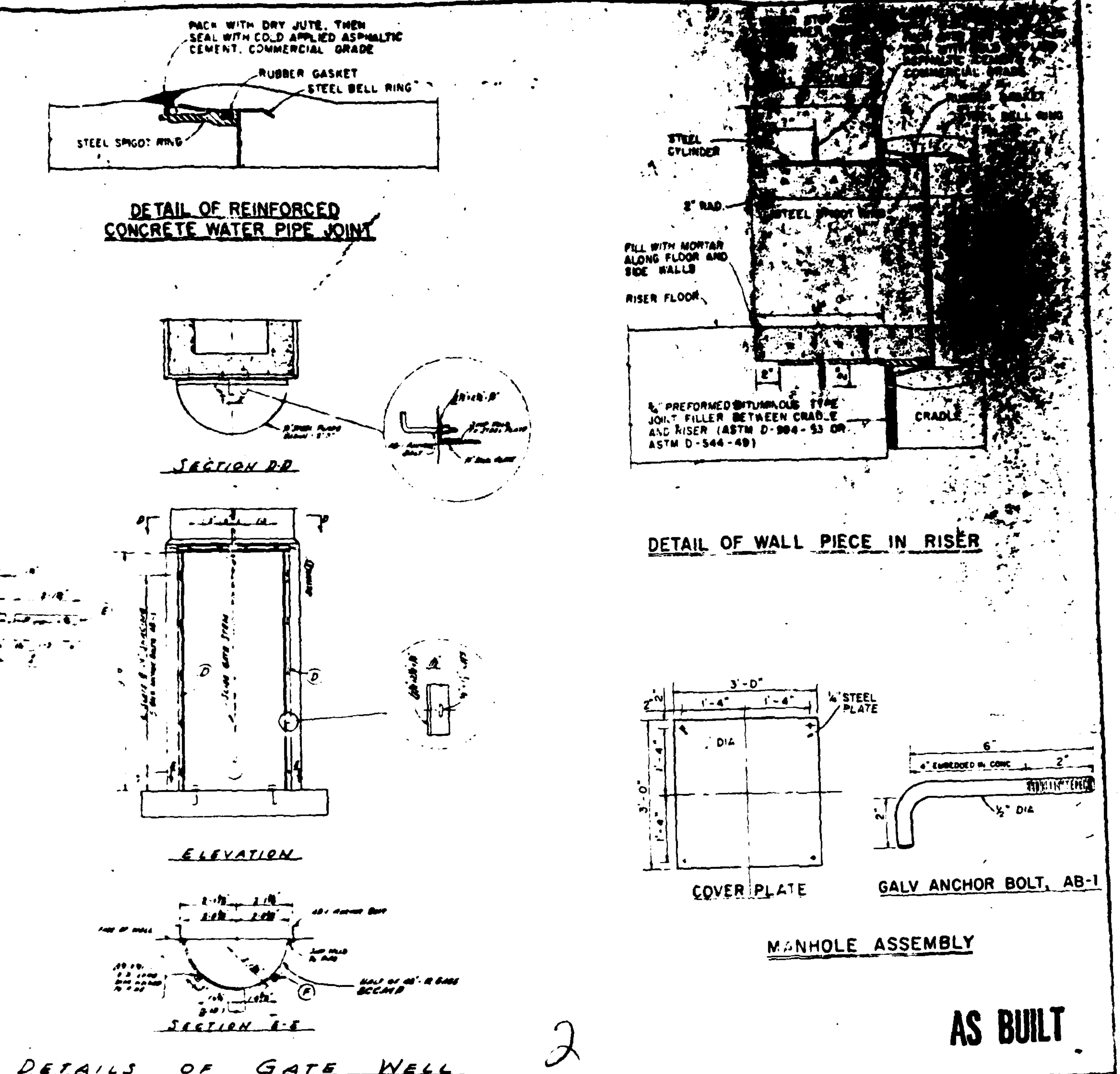
SECTION B-B



SECTION C-C

DETAILS OF LOW STAGE TRASH RACK
SCALE 1/2"=1'-0"

LOCATION
HIGH STAGE TRASH RACK
LOW STAGE TRASH RACK
GATE VALVE
MATERIALS
NOTE



2

AS BUILT

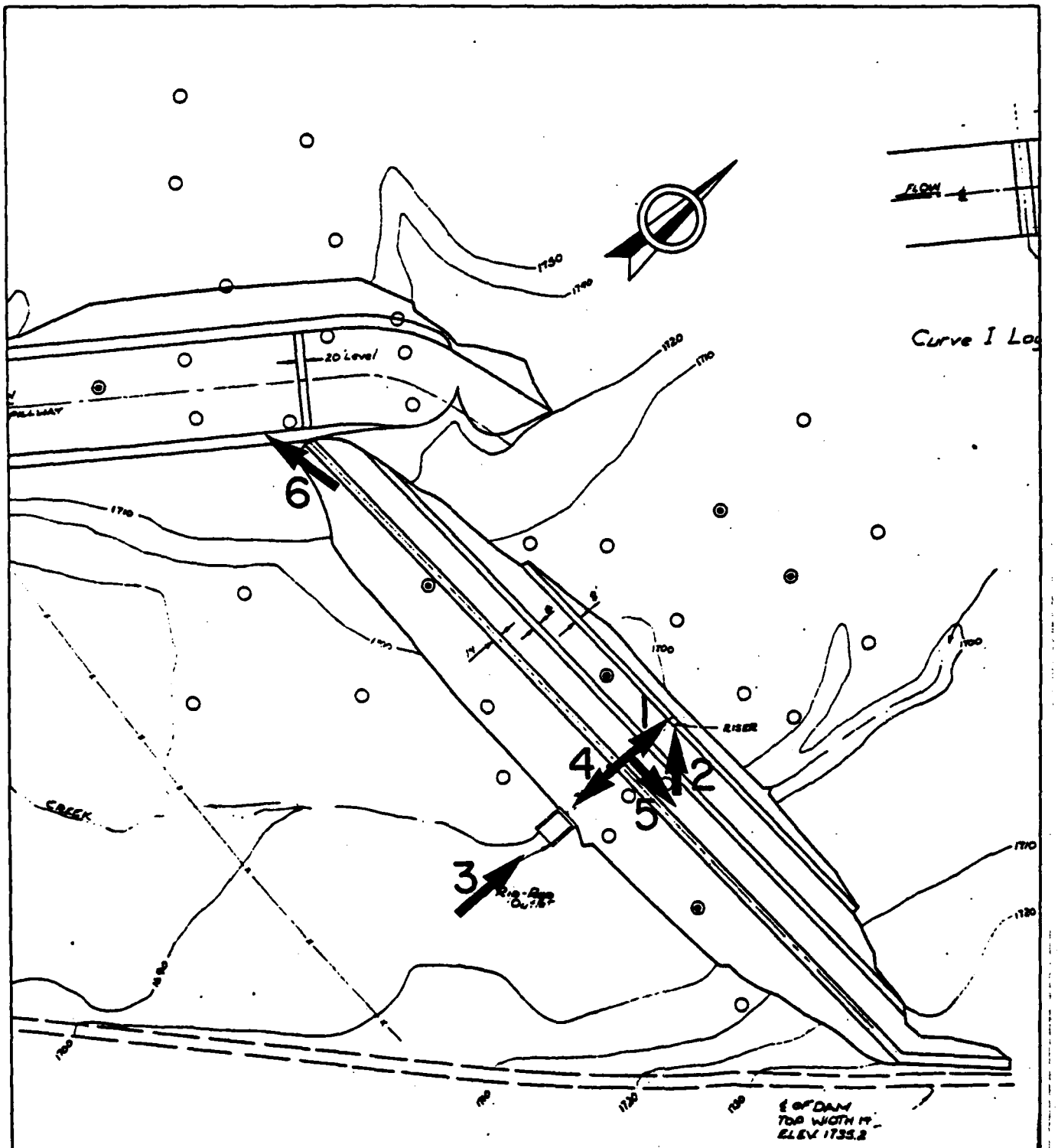
BILL OF MATERIAL				
LOCATION	ITEM	SIZE	LENGTH	QUANTITY
HIGH STAGE TRASH RACK	GALV PIPE STD. THREADED ENDS	[illegible]	[illegible]	[illegible]
	GALV PIPE SLEEVES	[illegible]	[illegible]	[illegible]
	GALV CAPS	[illegible]		[illegible]
LOW STAGE TRASH RACK	L ANGLE IRON	[illegible]	[illegible]	[illegible]
	L ANGLE IRON	[illegible]	[illegible]	[illegible]
	L ANGLE IRON	[illegible]	[illegible]	[illegible]
	REINF BAR	[illegible]	[illegible]	[illegible]
	REINF BAR	[illegible]	[illegible]	[illegible]
	REINF BAR	[illegible]	[illegible]	[illegible]
	ANCHOR BOLT - AB1 GALV.	[illegible]		[illegible]
GATE WELL	L ANGLE IRON	[illegible]	[illegible]	[illegible]
	L ANGLE IRON	[illegible]	[illegible]	[illegible]
	L ANGLE IRON	[illegible]	[illegible]	[illegible]
MANHOLE	ANCHOR BOLT AB1 GALV.	[illegible]		16
	ANCHOR BOLT AB1 GALV.	[illegible]		[illegible]
	STEEL PLATE	[illegible]	[illegible]	[illegible]
NOTE	ALL ANCHOR BOLTS SHALL BE [illegible]		As built plan	

ISCHUA CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM NO 2
JOHNSON CREEK
LAIDLAW, NEW YORK
GATE WELL, TRASH RACKS & MISC. DETAILS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

[illegible] BALL	Mar. '61		
[illegible] ELIAS	Mar. '61		
[illegible]	Apr. '61		NY-802-P

APPENDIX C

PHOTOGRAPHS

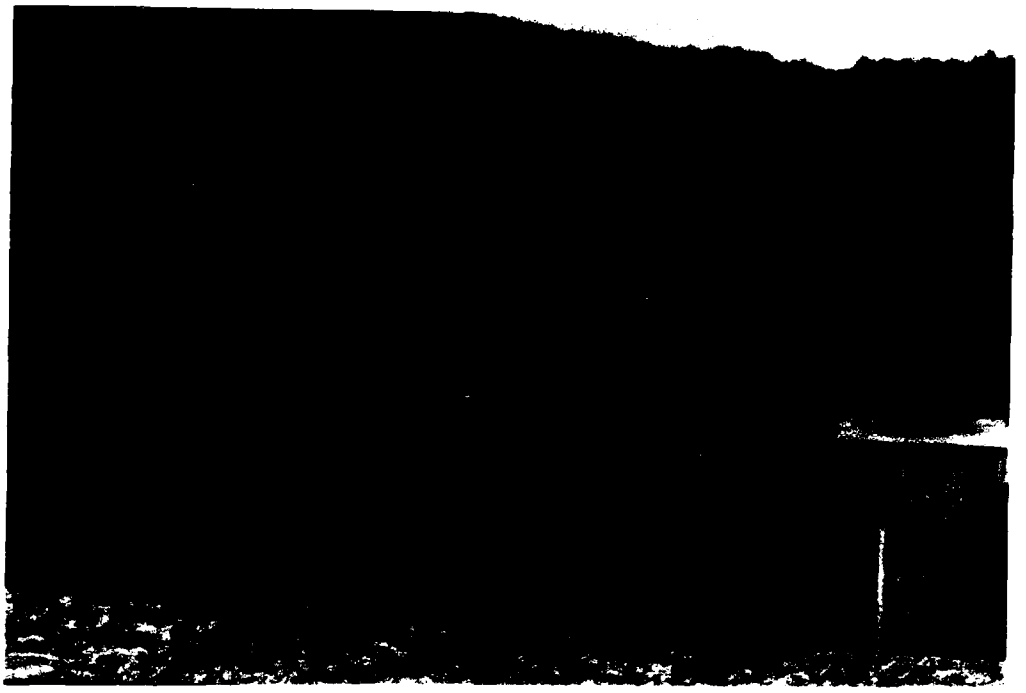


ISCHUA CREEK WATERSHED DAM #2

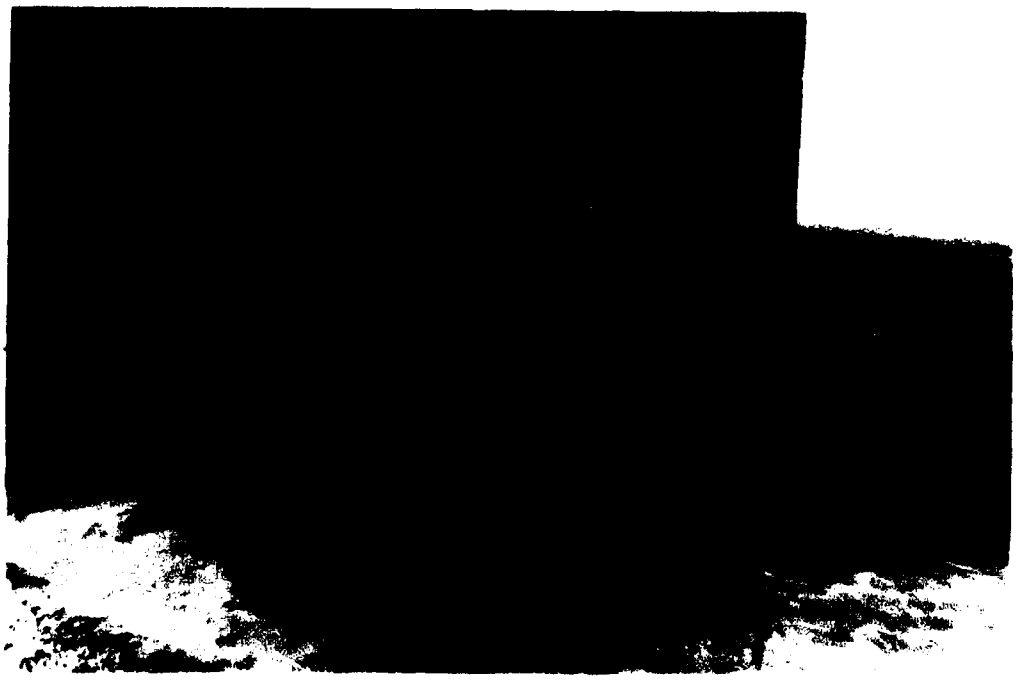
NY00560

PHOTO ORIENTATION PLAN

BROMAR, ANTHONY, ASSOCIATES CONSULTING ENGINEERS & PLANNERS	DATE MAY 1981	C-1



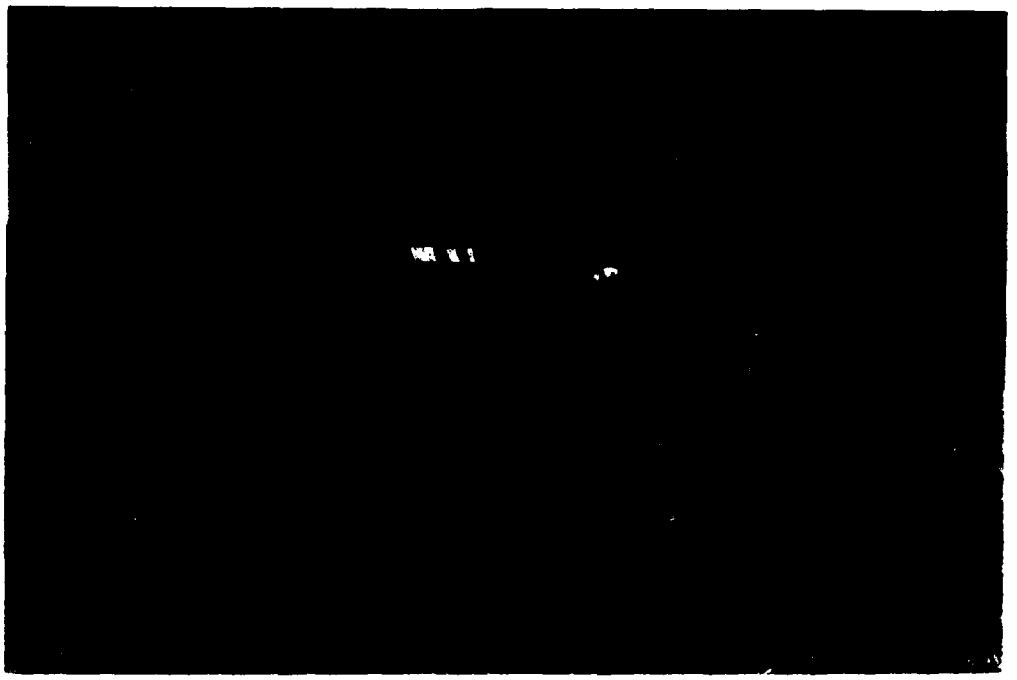
1. Principal spillway inlet structure and impoundment



2. Principal spillway low stage inlet showing trash rack

3. Principal spillway outlet pipe, and plunge pool

4. Downstream channel



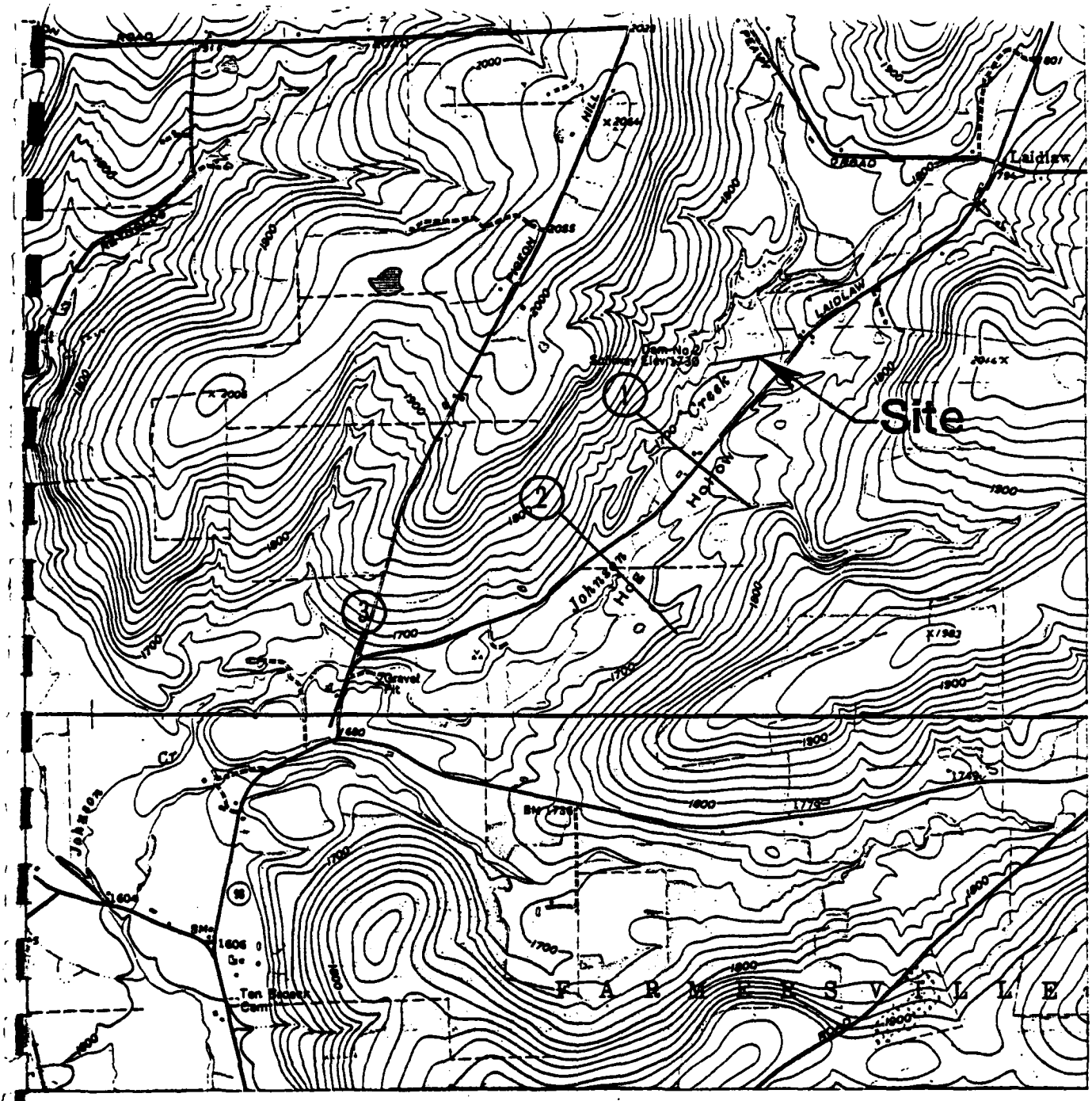
5. Crest of dam

6. Emergency spillway

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

APPENDIX D



Ischua Creek Watershed
Dam No. 2

CROSS SECTION LOCATION PLAN

Scale: 1" = 2000'

D-2

```
A1       ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF          DAM NY 560
A2       HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFETY OF ISCHUA CREEK DAM NO.2
A3       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
B   100         0       15                                  0       -1        4
B1      5
J       1        6        1
J1    0.2      0.4      0.5      0.6      0.8      1.0
K       0  INFLOW                          0        0        1
K1       CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR
M       1        1      2.8               2.8        0                      1
P       0     22.4      117      127      141      151
T                                                  1.0      0.1                     0
W    2.63     0.63
X     2.0     -.10      2.0
K       1 OUTFLOW                                  1
K1       CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR
Y                                  1        1
Y1      1                                          -1721.       -1
Y4 1721.    1725.    1729.    1730.    1731.    1732.    1733.    1734.    1735.    1736.
Y4 1737.
Y5     0.     100.     146.     310.     975.    1944.    3151.    4572.    6227.    8046.
Y510044.
S5    25.     215.     440.     555.     603.     677.
SE1706.5     1721     1729  1732.7     1734     1736
SS1729.5
SD1735.2      2.7      1.5     1400
K       1        1                                  1
K1     CHANNEL ROUTING -MOD PULS        RESERVOIR - 1
Y                                  1        1
Y1      1
Y6    .06      .04      .06     1680     1720     1730   0.0080
Y7     0     1720      700     1700     1180     1683   1192.5     1680   1207.5     1680
Y7  1220     1683     1600     1700     1750     1720
K       1        2                                  1
K1     CHANNEL ROUTING -MOD PULS REACH 1-2
Y                                  1        1
Y1      1
Y6  0.04     0.04     0.04     1660     1720     2200   0.0090
Y7     0     1720      200     1680     1180     1663   1192.5     1660   1207.5     1660
Y7  1220     1663     1900     1680     2050     1720
K       1        3                                  1
K1     CHANNEL ROUTING -MOD PULS REACH 2-3
Y                                  1        1
Y1      1
Y6    .04      .04      .04     1644     1680     5600   0.003
Y7     0     1680      190     1660    352.5     1647     365     1644      380     1644
Y7 392.5     1647      685     1660      873     1680
K      99
```

D-3

OK, SEQ SPECIFICATION

OK, SEQ SPECIFICATION
ENTER PROJECT NUMBER
60160-26.04
INPUT FILE ? NY560
1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****

PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS

RUNOFF HYDROGRAPH AT	INFLOW
ROUTE HYDROGRAPH TO	OUTFLOW
ROUTE HYDROGRAPH TO	1
ROUTE HYDROGRAPH TO	2
ROUTE HYDROGRAPH TO	3
END OF NETWORK	

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79
****

RUN DATE: 5/13/
TIME: 4:07 PM

D4

ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF DAM NY 560
HYDRULOGIC-HYDRAULIC ANALYSIS OF SAFETY OF ISCHUA CREEK DAM NO.2
RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

JOB SPECIFICATION

NQ	NHR	NMIN	IDAY	IHR	IMIN	METRC	IPLT	IPRT	NSTAN
100	0	15	0	0	0	0	-1	4	0
			JOPER	NWT	LROPT	TRACE			
			5	0	0	0			

MULTI-PLAN ANALYSES TO BE PERFORMED
NPLAN= 1 NRTIO= 6 LRTIO= 1
RTIOS= 0.20 0.40 0.50 0.60 0.80 1.00

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

CALCULATION OF INFLOW HYDROGRAPH TO RESERVOIR

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
INFLOW		0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	2.80	0.00	2.80	0.00	0.000	0	1	0

PRECIP DATA

	SPFE	PMS	R6	R12	R24	R48	R72	R96
	8.00	22,48	117,00	127.00	141,00	151,00	0,00	0.00

TRSPC COPPUTED BY THE PROGRAM IS 0.000

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0,00	0,00	1,00	0.00	0,00	1,00	1,00	0,10	0,00	0,00

UNIT HYDROGRAPH DATA

TP= 2.63 CP=0,63 NTA= 0

RECESSION DATA

STRTQ= 2,00 QRCSN= -0,10 RTIOR=2,00

UNIT HYDROGRAPH 57 END-OF-PERIOD ORDINATES, LAG= 2,61 HOURS, CP= 0,63 VOL= 1,00

13,	47,	98,	159,	211,	274,	33[illegible],	383,	418,	440,	
446,	438,	398,	358,	323,	290,	261,	235,	212,	190,	
171,	154,	139,	125,	112,	101,	91,	82,	74,	66,	
60,	54,	48,	44,	39,	35,	32,	29,	26,	23,	
21,	19,	17,	15,	14,	12,	11,	10,	9,	8,	
7,	7,	6,	5,	5,	4,	0,				

0

MO,DA	HR,MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	END-OF-PERIOD FLOW MO,DA	HR,MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	27,86	23,31	3,75	166744,
										(697,)(	592,)(	95,)(	(4238,49)

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CALCULATION OF OUTFLOW HYDROGRAPH FROM RESERVOIR

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
ITFLOW 1	0	0	0	0	0	1	0	0

ROUTING DATA

QCOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0,0	0,000	0,00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0,000	0,000	0,000	1781,	-1

STAGE	1721,00	1726,00	1729,00	1730,00	1731,00	1732,00	1733,00	1734,00	1735,00	1737,00
	1737,00									
FLOW	0,00	100,00	196,00	310,00	976,00	1914,00	3151,00	4572,00	6227,00	8041,00
	10044,00									
CAPACITY=	25,	21	999,	565,	603,	677,				
ELEVATION=	1707,	1726,	1729,	1733,	1734,	1736,				

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
1729,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0

OK, SEG HMEC1DB

PAGE 0001

DAM DATA

TOPEL	COOD	EXPD	DAMWID
1735.2	2.7	1.5	1400.

PEAK OUTFLOW IS 1103. AT TIME 43.25 HOURS

PEAK OUTFLOW IS 2538. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 3165. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 3815. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 6186. AT TIME 42.50 HOURS

PEAK OUTFLOW IS 6391. AT TIME 42.50 HOURS

****

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS RESERVOIR - 1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0			0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	-1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRA
1	0	0	0.000	0.000	0.000	0	

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELMVT	ELMAX	RLNTH	SEL
0.0600	0.0400	0.0600	1680.0	1720.0	1730.	0.00800

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1720.00 700.00 1700.00 1180.00 1683.00 1192.50 1680.00 1207.50 1680.00
1220.00 1683.00 1600.00 1700.00 1750.00 1720.00

STORAGE	0.00	1.99	6.67	19.59	41.41	72.13	111.76	160.30	217.74	284.08
	359.15	441.08	532.08	629.77	734.94	847.68	967.73	1095.34	1230.43	1373.01
OUTFLOW	0.00	219.90	1009.19	3039.23	6978.90	13395.26	22789.53	35621.30	52320.10	73293.17
	99373.50	130911.88	167695.50	209954.59	257924.97	311843.81	371948.19	438474.06	511655.81	591724.88
STAGE	1680.00	1682.11	1684.21	1686.32	1688.42	1690.53	1692.63	1694.74	1696.84	1698.95
	1701.05	1703.16	1705.26	1707.37	1709.47	1711.58	1713.68	1715.79	1717.89	1720.00
FLOW	0.00	219.90	1009.19	3039.23	6978.90	13395.26	22789.53	35621.30	52320.10	73293.17
	99373.50	130911.88	167695.50	209954.59	257924.97	311843.81	371948.19	438474.06	511655.81	591724.88

MAXIMUM STAGE IS 1684.3

MAXIMUM STAGE IS 1685.8

MAXIMUP STAGE IS 1686.4

MAXIMUM STAGE IS 1686.7

MAXIMUM STAGE IS 1687.4

MAXIMUM STAGE IS 1688.1

HYDROGRAPH ROUTING

CHANNEL ROUTING

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	2	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.00	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELVT	ELMAX	RLNTH	SEL
0.0400	0.0400	0.0400	1663.0	1720.0	2200.	0.00500

CROSS SECTION COORDINATES (STA,ELEV,STA,ELEV,ETC

0.00 1720.00 200.00 1680.00 1180.00 1663.00 1192.00 1668.00 1207.50 1668.00
1220.00 1663.00 1700.00 1680.00 2050.00 1720.00

STORAGE	0.00	4.56	37.97	128.67	282.34	533.20	643.48	932.76	1285.02	1681.68
	1774.75	2014.22	2368.11	2656.39	2959.09	3266.17	3577.79	3893.61	4213.93	4536.66
OUTFLOW	0.00	528.67	4962.28	20796.67	59044.34	139732.45	192368.69	321116.31	687497.75	1411591.25
	981924.13	1147360.75	1417046.25	1710298.50	2026864.50	2368393.00	2726615.50	3109322.50	3513860.00	3937981.50
STAGE	1660.00	1663.16	1666.32	1669.47	1672.63	1675.79	1678.95	1682.10	1685.26	1688.42
	1691.58	1694.73	1697.89	1701.05	1704.21	1707.37	1710.52	1713.68	1716.84	1720.00
FLOW	0.00	528.67	4962.28	20796.67	59044.34	139732.45	192368.69	321116.31	687497.75	1411591.25
	981924.13	1147360.75	1417046.25	1710298.50	2026864.50	2368393.00	2726615.50	3109322.50	3513860.00	3937981.50

MAXIMUM STAGE IS 1663.6

MAXIMUM STAGE IS 1664.6

OK, SEG RHECIOB

MAXIMUM STAGE IS 1665.0

MAXIMUM STAGE IS 1665.5

MAXIMUM STAGE IS 1666.3

MAXIMUP STAGE IS 1666.6

HYDROGRAPH ROUTING

CHANNEL ROUTING -NOD PUL REACH 2-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

CLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRA
1	0	0	0.000	0.000	0.000	0	

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELMVT	ELMAX	RLNTH	SEL
0.0400	0.0400	0.0400	1644.0	1680.0	5600.	0.00300

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC

0.00 1680.00 180.00 1660.00 352.50 1647.00 365.00 1644.00 380.00 1644.00
392.50 1647.00 685.00 1660.00 873.00 1680.00

STORAGE	0.00	5.58	16.18	40.96	82.34	140.22	214.60	305.49	412.88	531.55
	667.58	807.94	956.87	1114.29	1280.21	1454.61	1637.50	1828.88	2026.76	2231.12
OUTFLOW	0.00	110.14	474.72	1408.47	3219.22	6216.27	10641.12	16721.57	24669.98	35221.98
	48272.22	63386.02	80600.55	99961.20	121518.61	145326.84	171442.03	199921.81	230824.66	264205.56
STAGE	1644.00	1645.89	1647.79	1649.68	1651.58	1653.47	1655.37	1657.26	1659.16	1661.05
	1662.95	1664.84	1666.73	1668.63	1670.52	1672.42	1674.31	1676.21	1678.10	1680.00
FLOW	0.00	110.14	474.72	1408.47	3219.22	6216.27	10641.12	16721.57	24669.98	35221.98
	48272.22	63386.02	80600.55	99961.20	121518.61	145326.84	171442.03	199921.81	230824.66	264205.56

MAXIMUM STAGE IS 1649.0

MAXIMUM STAGE IS 1650.8

MAXIMUM STAGE IS 1651.5

MAXIMUM STAGE IS 1651.9

OK, SEQ CHECKED

MAXIMUM STAGE IS 0, 1652.7

MAXIMUM STAGE IS 1, 1653.5

1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIO 1	RATIO 2	RATIO 3	RATIO 4	RATIO 5	RATIO 6
				0.20	0.40	0.50	0.60	0.80	1.00
HYDROGRAPH AT	INFLOW	2.00	1	1291.	2583.	3228.	3874.	5165.	6457.
		(5.25)	1	(36.57)	(73.13)	(91.42)	(109.70)	(146.27)	(182.84)
ROUTED TO	OUTFLOW	2.00	1	883.	2538.	3165.	3815.	5106.	6391.
		(5.25)	1	(25.00)	(71.86)	(89.63)	(108.03)	(144.58)	(180.98)
ROUTED TO	4	2.00	1	1103.	2533.	3161.	3806.	5097.	6382.
		(5.25)	1	(31.23)	(71.72)	(89.50)	(107.77)	(144.32)	(180.71)
ROUTED TO	2	2.00	1	1102.	2534.	3162.	3807.	5099.	6387.
		(5.25)	1	(31.20)	(71.76)	(89.53)	(107.81)	(144.38)	(180.85)
ROUTED TO	3	2.00	1	1061.	2526.	3128.	3766.	5043.	6326.
		(5.25)	1	(30.05)	(71.53)	(88.57)	(106.62)	(142.81)	(179.14)

1

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1721.00	1729.50	1735.20
STORAGE	215.	456.	647.
OUTFLOW	0.	228.	6591.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1731.13	0.00	586.	1103.	0.00	43.25	0.00
0.40	1732.49	0.00	549.	2538.	0.00	42.50	0.00
0.50	1733.81	0.00	566.	3165.	0.00	42.50	0.00
0.60	1733.47	0.00	583.	3815.	0.00	42.50	0.00
0.80	1734.32	0.00	615.	5106.	0.00	42.50	0.00
1.00	1735.09	0.00	643.	6391.	0.00	42.50	0.00

PLAN 1 STATION 1

RATIO	FLOW,CFS	STAGE,FT	HOURS
0.20	1103.	1684.3	43.50
0.40	2533.	1685.8	42.75
0.50	3161.	1686.4	42.75
0.60	3806.	1686.7	42.50
0.80	5097.	1687.4	42.50
1.00	6382.	1688.1	42.50

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1102.	1663.6	43.50
0.40	2534.	1664.6	42.75
0.50	3162.	1665.0	42.75
0.60	3807.	1665.5	42.75
0.80	5089.	1666.3	42.50
1.00	6367.	1666.6	42.75

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1861.	1649.0	44.00
0.40	2581.	1650.0	43.00
0.50	3128.	1651.5	43.00
0.60	3776.	1651.9	43.00
0.80	5043.	1652.7	43.00
1.00	6326.	1653.5	42.75

FLF DATE 2/16/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 1 OF ~

B.R. DATE 3/16/81 SUBJECT DAM 560 HYDROLOGY SUB-SHEET NO. 1

OWNER PROJECT NAME HEC-1 DB DAM INSPECTION 80166-00-04

DAM 560 ISCHUA CREEK DAM #2 REFF. QUAD. DELEVAN, N.Y.

DRAINAGE DISTANCE

DISTANCE L & L ca MEAS. WITH MAP MEASURING WHEEL (1" = 2000')

COMPUTATION FOR L DISTANCE

RUN		MEAS. DIST.	AVG. DIST.	COEF.	L DISTANCE
A	1 =	6.18"			
	2 =	6.10"			*
		12.28" ÷ 2 = 6.14	x 2000'	=	12280 FT.
B	1 =	5.8"			
	2 =	5.85"			
		11.65 ÷ 2 = 5.83	x 2000'	=	11650 FT.
C	1 =	5.6"			
	2 =	5.6			
		11.2 ÷ 2 = 5.6	x 2000'	=	11200 FT.

* L = 12280 FT (USED RUN A)

COMPUTATIONS FOR L ca DISTANCE

RUN		MEAS. DIST.	AVG. DIST.	COEF.	L ca DISTANCE
A	1	2.75"			
	2	2.80			*
		5.55 ÷ 2 = 2.78	x 2000'	=	5550 FT.

* L ca = 5550 FT.

$$T_p = C_T (L L_{ca})^{0.3}, \qquad C_T = 2.00 \checkmark$$

$$C_p = 0.63 \checkmark$$

$$T_r = \frac{T_p}{5.5}$$

$$T_{pR} = T_p + 0.25 (T_R - T_r)$$

$L = 12280$ ft $= 2.33$ mi ✓

$L_{ca} = 5550$ ft $= 1.05$ mi ✓

$T_p = 2 (2.33 \times 1.05)^{0.3} = 2.62$ hr ✓

$T_r = \frac{2.62}{5.5} = 0.48$ hr $\Longrightarrow$ $T_R = 0.5$ hr ✓

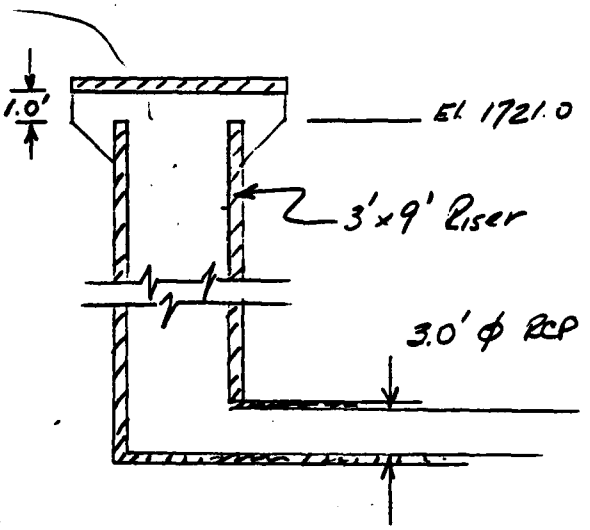
$t_{pR} = 2.62 + 0.25 (0.5 - 0.48) = 2.63$ hr. ✓

BY [illegible] DATE 3/26/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 3 OF 14

CHK'D RHA DATE 3/27/81 SUBJECT DAM 560 - Hydraulics SUB-SHEET NO. 1

OWNER PROJECT NAME DAM INSPECTIONS (80166-00.06)

Service Spillway



Assume that the 3.0' ϕ RCP is the control & develope an eqtn. of the form $Q = CA\sqrt{2gH}$ to describe the flow.

From Design Report:

Q_s = 146 cfs @ El. 1729.0

Q_s = 0 cfs @ El. 1721.0

$A_o = \pi (1.5)^2 = 7.1\ ft^2$

Determine C_o from Q_s = 146 cfs & 0 cfs.

$H = 1729.0 - 1721.0 = 8.0'$

$$C_o = \frac{Q_s}{A_o\sqrt{2g}\,H_o} = \frac{146\ cfs}{(7.1\ ft^2)\sqrt{2(32.2)(8.0)}} = 0.91$$

Elev.	H_o	Q
1725	4.0	104
1729	8.0	147
1730	9.0	156
1731	10.0	164
1732	11.0	172
1733	12.0	180
1734	13.0	187
1735	14.0	194
1736	15.0	201
1737	16.0	207
1738	17.0	214
1739	18.0	220
1740	19.0	226

$$Q_s = 0.91\,(7.1\ ft^2)(\sqrt{2\times 32.2})\,H_o^{0.5}$$

$$= 51.85\,H_o^{0.5}$$

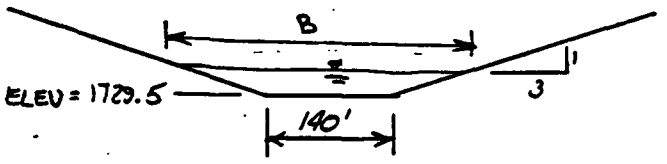
1735.1	14.1	194.70
1735.2	14.2	195.39

EMERGENCY SPILLWAY

Ref: "Bater & King" Table 8-7 page 8-59
"Determining The Discharge Q Of A Trapezoidal Channel When Flow Is At Critical Depth"

Check to see if flow goes through critical depth. Determine critical slope for depths of flow y = 1' ... If spillway slope > critical slope flow goes through critical depth and Table 8-7 holds.

$$\frac{Q^2}{g} = \frac{A^3}{B} \qquad Q_c = \sqrt{\frac{gA^3}{B}}$$



EMERGENCY SPILLWAY SECTION
($S_o = 0.026$)

For y = 1'

$A = 140'(1') + 2'(\frac{1}{2} \times 3' \times 1') = \underline{143 ft^2}$ ✓

$B = 140 + 2(3 \times 1') = \underline{146 ft}$ ✓

$$Q_c = \sqrt{\frac{32.2\ (143 ft^2)^3}{146 ft}} = \underline{803 cfs}$$ ✓

$$K = \frac{1.49}{n} AR^{2/3} = \frac{1.49}{0.035}(143 ft^2)\left(\frac{143 ft^2}{146.32 ft}\right)^{2/3} = 5995$$ ✓

$$S_c = \left(\frac{Q_c}{K}\right)^2 = \left(\frac{803 cfs}{5995}\right) = \underline{0.018}$$ ✓

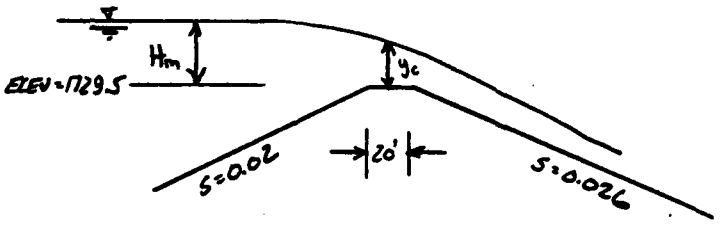
spillway slope > critical slope ∴
0.026 > 0.018

∴ Flow goes through critical depth for y = 1 ft and also for y > 1 ft. Use Table 8-7 "Bater & King"

$Z = .3/1 = 3.0$

$b = 140\ ft$

$Q_E = C_E\, b\, H_m^{1.5}$



H_m	$\frac{H_m}{b}$	C_E	Q_E	ELEV.
0.0	0	0	0	1729.5
0.5	0.011	3.11	154	1730.0
1.5	0.032	3.15	810	1731.0
2.5	0.054	3.20	1771	1732.0
3.5	0.075	3.24	2970	1733.0
4.5	0.096	3.28	4383	1734.0
5.5	0.118	3.34	6031	1735.0
6.5	0.139	3.38	7842	1736.0
7.5	0.161	3.42	9834	1737.0

PRP DATE 3/23/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 6 OF 12
RWB DATE 3/31/81 SUBJECT DAM 560 - HYDRAULICS SUB-SHEET NO. 4
OWNER PROJECT NAME DAM INSPECTION 8016G-00.04

ISCHUA CREEK DAM # 2
$A RAREA RESEVOIR SURFACE AREA
$E RELEA R1

REFF. U.S. DEPT. OF A.S.C.S AS BUILT PLANS DRW. NY-602-E
SCALE 1"=200.X ½ REDUCTION : 1"= 400'

Eq. $in^2 \times \frac{(400\ ft)^2}{in^2} \times \frac{1\ AC}{43{,}560\ ft^2} = Ac.$

ELEV. 1706.5 = 7.0 Ac GIVEN

ELEV 1725

$7.05\ in^2 \times \frac{(400\ ft)^2}{in^2} \times \frac{1\ AC}{43{,}560\ ft^2} = 25.90\ AC.$ ✓

ELEV. 1729.0 = 32.5 Ac GIVEN

ELEV. 1730

$9.23\ in^2 \times \frac{(400\ ft)^2}{in^2} \times \frac{1\ AC}{43{,}560\ ft^2} = 33.90\ AC$ ✓

ELEV. 1735

$11.10\ in^2 \times \frac{(400\ ft)^2}{in^2} \times \frac{1\ AC}{43560\ ft^2} = 40.77\ Ac.$ ✓

ELEV. 1740

$13.7\ in^2 \times \frac{(400\ ft)^2}{in^2} \times \frac{1\ AC}{43560\ ft^2} = 50.32\ AC.$ ✓

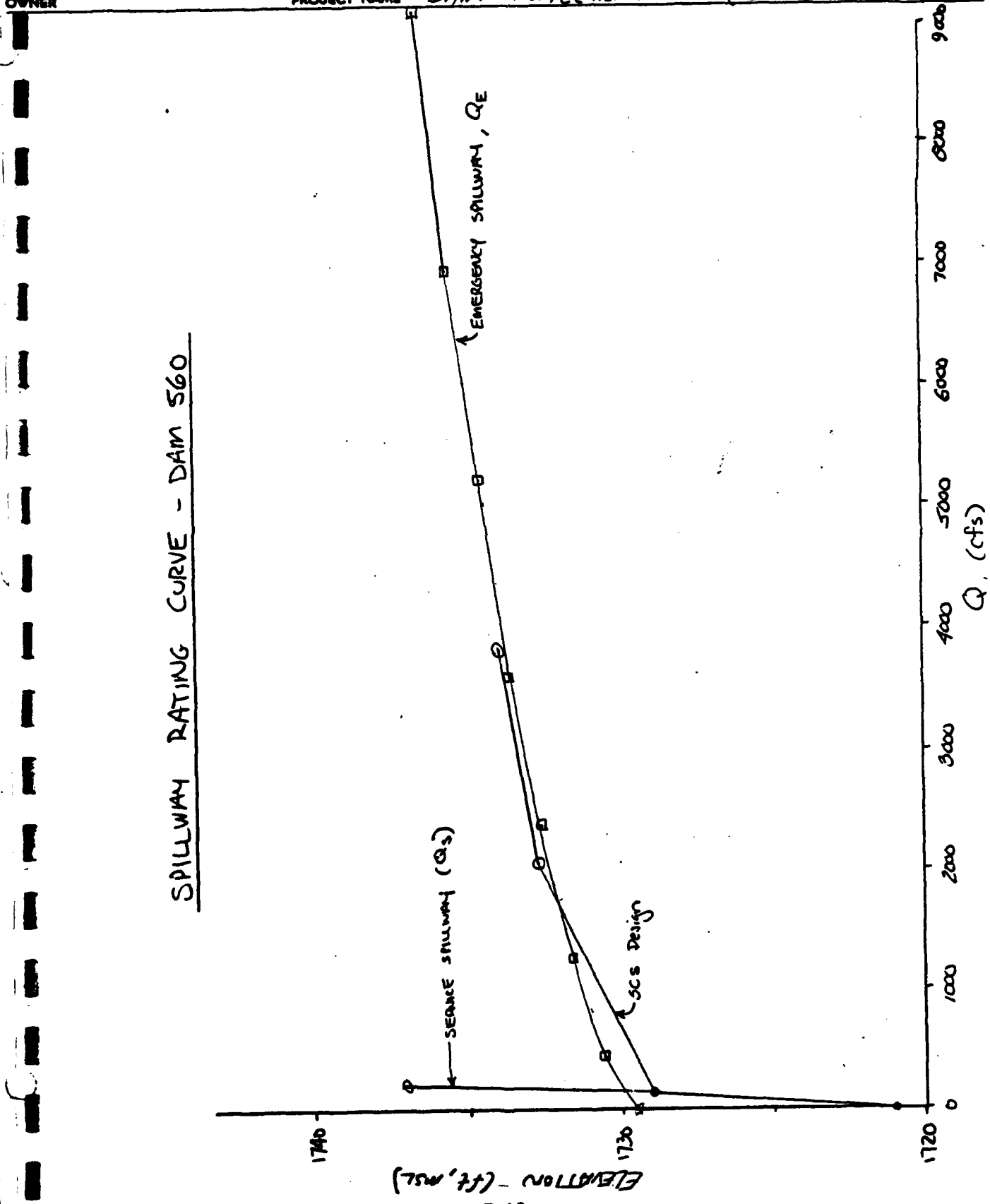
★ Use stage-storage relationship from Design Report see sheet 7/12

Total Spillway Discharges ($Q_S + Q_E$)

Elev.	$Q_S + Q_E$	Reservoir Surface Area	
1721.0	0	22 acres	✓
1725.0	104	25.9 "	✓
1729.0	147	32.5 "	✓
1730.0	310	33.9 "	✓
1731.0	974	—	✓
1732.0	1943	—	✓
1733.0	3150	—	✓
1734.0	4570	—	✓
1735.0	6225	40.77 "	✓
1736.0	8043	—	✓
1737.0	10,041	—	✓
1738.0		—	
1739.0		—	
1740.0		50.32 "	✓

Stage - Storage Relationship

ELEV.	Storage (AF)	
1706.5	25	From design report
1721.0	215	From design report
1729.0	440	From design report
1732.7	555	From design report
1734.0	603	From design report
1736.0	677	– extrapolated.


SPILLWAY RATING CURVE - DAM 560
EMERGENCY SPILLWAY, Q_E
SERVICE SPILLWAY (Q_S)
SCS Design
Q, (cfs)
0
1000
2000
3000
4000
5000
6000
7000
8000
9000
1720
1730
1740
ELEVATION - (ft, MSL)

BY DATE

D TKH DATE 3/22/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 9 OF 12

SUBJECT DAM #10 - Hydraulics SUB-SHEET NO. 7

OWNER PROJECT NAME DAM INSPECTIONS (80166-00.04)

Overtopping Data

Dam Height = 1735.2

Discharge Coefficient (C) = 2.7

Exponent (E) = 1.5

Length of Dam Crest = 1400'

Emergency Spillway Capacities

Flood	Q_{total}	Elev.	Q_{es}	A	V	Comments
PMF	6391 ✓	1735.09 ✓	6194	634	9.8	78.0 ∴ erosion
½ PMF	3165 ✓	1733.01 ✓	2970 ✓	403 ✓	7.4 ✓	<8.0 ∴ no erosion

b = 140

PMF

Assume $y_n/b < 0.02 \Rightarrow y_n = 0.789\left(\frac{Qn}{b S_o^{1/2}}\right)^{0.6}$

$y_n = 0.789\left(\frac{2970(0.06)}{140(0.026)^{1/2}}\right)^{0.6} = 2.72'$ ✓ $\frac{y_n}{b} = \frac{2.72'}{140'} = 0.019 < 0.02$ OK

$A = (2.72')(140') + \frac{1}{2}(2.72')(3)(2.72) = 403\ ft^2$ ✓

$V = \frac{Q}{A} = \frac{2970}{403} = 7.4\ ft/sec$ ✓

½ PMF

Elev	Q
1735	6031
1736	7842

$y_{n:09} = 6031 + .09(7842 - 6031) = 6194\ cfs$

$y_n = 0.789\left(\frac{6194(0.06)}{140(0.026)^{1/2}}\right)^{0.6} = 4.24'$ ✓ $\frac{y_n}{b} = 0.03 > 0.02$ N.G.

Ref: Fund. of Open Channel Hydraulics, Table 103E, pg. 6

$\frac{Q(n)}{(b^{8/3})(S_o^{1/2})} = \frac{6194(0.06)}{(140)^{8/3}(0.026)^{1/2}} = 0.00436$ ✓ $\Rightarrow y_n = 4.16'$ ✓

$A = (4.16')(140') + \frac{1}{2}(4.16')(3)(4.16') = 634\ ft^2$ ✓

$V = \frac{Q}{A} = \frac{6194}{634} = 9.8\ ft/sec$ ✓

B.R. 4/13/81
RLA 4/13/81

ISCHUA CREEK DAM #2

DAM DATA FROM AS-BUILT PLAN

DAM TOP ELEV. 1736.4
DAM INV. ELEV. 1694.0

1720	1700	1683	1680	1680	1683	1700	172
0	700	1180	1192.5	1207.5	1220	1600	175

✓

REACH 1 LENGTH = 1730'

(Y6) 6 RLNTH
(Y7) 1-10 X&Y

CROSS SECT

1720	1700	1680	1680	1700	1720
0	700	1145	1205	1600	1750

✓

SLOPE: DAM INV. − REACH 3 INV. = h ÷ L = SLOPE
1694.0 − 1680 = 14' ÷ 1730' = 0.008 = S

(Y6) 7 SEL

REACH 2 LENGTH = 2200'

1720	1680	1663	1660	1660	1663	1680	1720
0	200	1180	1192.5	1207.5	1220	1900	2050

✓

CROSS SECT.

1720	~~1700~~	1680	1678	1680	1660	1660	1680	1720
0	~~100~~	200	350	550	1145	1205	1400	2050

SLOPE: REACH 3 INV. − REACH 4 INV. = h ÷ L = SLOPE
1680 − 1660 = 20 ÷ 2200 = 0.009 = S

✓

REACH 3 LENGTH = 5600'

1680	1660	1647	1644	1649	1647	1660	1680
0	180	352.5	365	380	392.5	685	873

CROSS SECT.

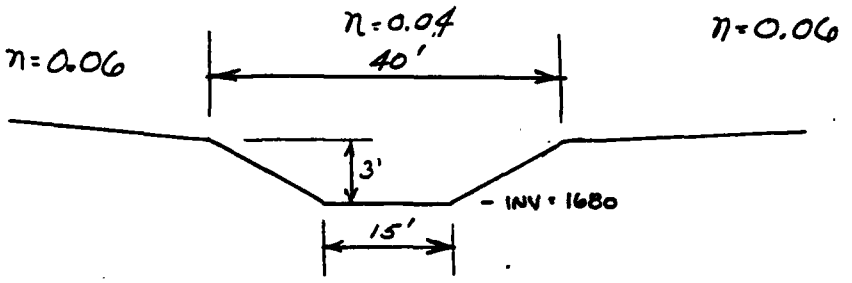
1681	1680	1660	1658	1658	1660	1681
0	690	870	1055	1070	1375	1563

SLOPE: REACH 4 INV. − REACH 5 INV. = h ÷ L = SLOPE
1660 − ~~1658~~ 1644 = 2 ÷ 5600' = 0.~~000~~ 003 = S

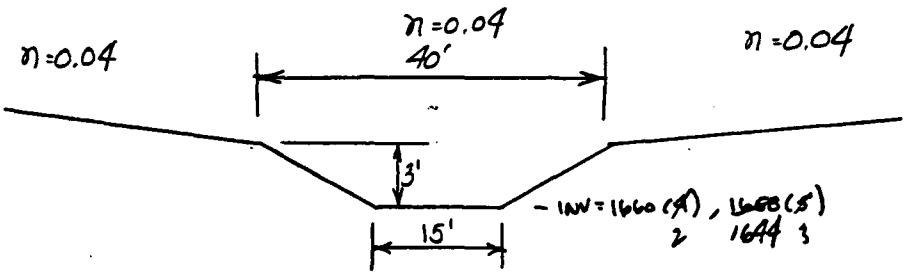
✓

DAM 560 - CHANNEL SECTIONS

SECTION 1:



SECTIONS 2 & 3:



APPENDIX E

INFORMATION AS CONTAINED IN THE NATIONAL INVENTORY OF DAMS

INVENTORY OF DAMS

80/11/14. PAGE 124

FORM 6474 ITEM	NOMENCLATURE	DATA
1	ID	NY00560
2	DIVISION	NAD
3	STATE	33
4	COUNTY	009 (CATTARAUGUS)
5	CONGR. DIST.	39
6	2ND STATE	
7	2ND COUNTY	
8	2ND CONGR	
9	OFF. DAM NAME	ISCHUA CREEK WATERSHED DAM #2
10	LATITUDE	42-23.4
11	LONGITUDE	078-25.8
12	REPORT DATE	80/09/14.
13	POPULAR NAME	NONE
14	IMPOUND. NAME	UNKNOWN
15	REGION	05
16	BASIN	01
17	RIVER/STREAM	JOHNSON CREEK
18	D/S CITY-TOWN	FRANKLINVILLE
19	DISTANCE	004
20	POPULATION	00002450
21	TYPE OF DAM	RE
22	YEAR COMPLETED	1961
23	PURPOSES	C
24	STR. HEIGHT	0038 42
25	HYD. HEIGHT	0000 36
26	MAX CAPACITY	00000~~00~~ 647
27	NORMAL CAP.	00000025
27A	CORPS DIST.	ORP
27B	OWNER CODE	N
27C	FED. REGULATED	N
27D	PVT. ON FED.	N
27E	SCS ATH	N
27F	VERIFY DATE	80/09/25.

FORM 6474 ITEM	NOMENCLATURE	DATA
28	(SEE BELOW)	
29	D/S HAZARD	I
30	CREST LENGTH	~~01300~~ 1400 + 174 = 1574
31	SPILLWAY TYPE	U
32	SPILLWAY WIDTH	0140 + 34 = 174
33	MAX DISCHARGE	~~0000133~~ 6997
34	VOLUME	000138749
35	POWER INSALLED	
36	POWER PROPOSED	
37	NO. OF LOCKS	0
38-45	LOCK LEN/WID	
46	OWNER NAME	(CATTARAUGUS COUNTY) Ischua Creek County Small Watershed Protection District
47	ENGINEERING	
48	CONSTRUCTION	
49	REG. DESIGN	DEC
50	REG. CONST	DEC
51	REG. OPER.	~~FED~~ SCS
52	REG. MAINT.	DEC
53	INSPECTOR	
54	INSP. DATE	
55	INSP. AUTH.	EN CON LAW SECT 15-0507
56	(SEE BELOW)	
57	INSP. INIT.	DZ APE 81
58	UNSAFE	
59	URGENCY	
60	INSP. COMPL.	15 MAY 81
61	RPT. APPR.	
62	GOV. NOTIF.	
63	INSPECTOR	DC
64	GOV. RPT.	
65	DEFICIENCY	OP

28 REMARK 1-10-25-2977 2A-UNKNOWN MINIMUM USED

56 REMARK ~~31-0800 INLET NORMAL, 33-RISE WIDTH OF TRAPEZOID~~

INSP. REMARK 30 - EMERGENCY SPILLWAY ; PRINCIPAL SPILLWAY IS A 36 IN. CONDUIT WITH 8.0 FT. X 3.0 FT.. RISER.

32 - TOTAL OF EMERGENCY AND PRINCIPAL SPILLWAY.

E-1

END

DATE
FILMED

11-8

DTIC